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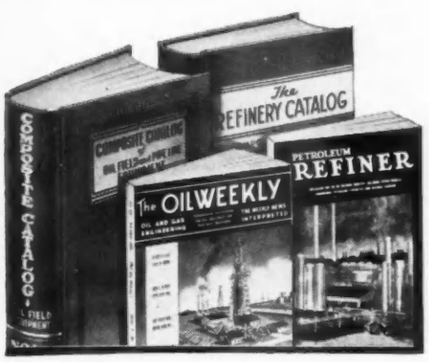

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The Oil Man's Calendar

FEB.	
4	National Oil Scouts and Landmen's Association, Dallas, Texas.
15-18	American Institute of Mining and Metallurgical Engineers, New York.
APR.	
8- 9	American Petroleum Institute, Division of Production, Eastern District, Wm. Penn Hotel, Pittsburgh.
7- 9	American Association of Petroleum Geologists, Fort Worth, Texas.
MAY	
5- 6	Petroleum Electrical Association, Houston.

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The Changing Panorama

Crude Oil Stocks Dangerously Low

EACH week increases the anxiety as to the ability of the industry to meet prospective large wartime demands for petroleum.

Last week the economic committee of the Petroleum Industry War Council predicted that demand in the last quarter of 1943, a year hence, would be 450,000 barrels greater per day than currently. Total demand, the committee reported, would reach 4,670,000 barrels per day. Calculating supply against this figure, the committee pointed out that it would be necessary to produce in excess of 400,000 barrels additional crude oil per day if this demand is to be met.

For several months there has been considerable question of the nation's crude oil producing ability, and it is generally believed that Texas is the only region where output can be increased for any sustained period. Other territories are producing all that can be expected of them. Even in Texas, there is not too much complacency about the state's production potential, which is diminishing with drilling cut to half of normal and fewer major fields being found. Prospects for meeting the enlarged demand are dark.

While much has been said with reference to the likelihood that demand would tax production capacity, little attention has been paid to the exceptionally heavy withdrawals of petroleum from storage during 1942. Today oil stocks are at dangerously critical levels. The downward trend of stocks, in view of expected substantial gains in consumption next year and the question of the ability to produce larger volumes of crude oil, materially increases the prospects that the industry may not be able to fill consumptive demands.

Crude oil stocks are rapidly approaching a 20-year low. Since the end of March, 1942, almost 30 million barrels have been taken from storage. This is in contrast with the addition of more than 20 million barrels during the corresponding period of 1941. Currently crude stocks amount to 234 million barrels, a level the industry in the past has declared is necessary for efficient operations. Only once in the past 20 years have stocks been below this figure. This was in 1939, when six Mid-Continent states shutdown production, and stocks dropped to 229 million barrels, or only 5 million under the present volume. If present withdrawal rates continue, it will be only a few months until this level is reached.

It would seem wise to adopt a policy of producing slightly larger quantities today, so it would not be necessary to draw so heavily in the future. In other words stocks should be at least maintained, if not increased gradually, to prepare for the enlarged future consumption. But unfortunately Texas is the only territory that can produce more, and whereas the nation's stocks have dropped sharply in the past 8 months Texas has added 8 million barrels.

Some of the reduction can be attributed to transportation troubles. With Oklahoma, Kansas, Illinois and Eastern States called upon for larger amounts than they could produce when Texas production was shut off from markets by loss of tankers. When the pipe-line programs are completed this situation will be remedied partially, for Texas oil will be available. But it is doubtful if Texas can make up the difference over a long period without damaging its productive capacity.

It appears that we are in dire need of discovering new prolific producing fields.

Sore Back?

A SORE back is the reason given by Leon Henderson for the resignation of his job as chief of OPA. It really does not matter what excuse is given. The facts are that the American people do not like to be regimented, even when in war and if regimented they must be, they want the regimenter at least to act like he regrets the regimentation! A great many people have felt that Henderson mistook wisecracks for wisdom, smart alecness for ability. In any event many Americans have thought that they could detect a distinct note of gloating in the attitude of the OPA administrator. Mr. Henderson no doubt would deny having any such attitude. The job of being price administrator is just about the toughest assignment possible these days, and unless the administrator is more than ordinarily full of the milk of human kindness, unless the people sense that he has deep sympathy for those affected by his administration, he has two strikes on him at the beginning. Mr. Henderson had three strikes when he went to bat and few there will be who will bemoan his passing.

African Invasion Hits East Coast Supplies

BECAUSE the Atlantic Seaboard is the nearest source of supply, the African invasion is a substantial factor in the deterioration of East Coast petroleum supplies to such a critical level that "A" gasoline ration coupons have been eliminated.

There is a saving of three sevenths in the time required to get oil to North Africa by shipping from Eastern ports instead of from the Gulf Coast. Consequently, the large quantity of petroleum originally taken with the African invasion fleet drew heavily upon the already reduced East Coast supplies, while the necessity of maintaining the African petroleum supply continues the heavy draft on stocks of this region. The exact amount of petroleum required is a military secret, but the fact that 70 percent by weight of all material carried to a battlefront is petroleum, shows the astronomical quantities of oil needed.

With East Coast petroleum supplies previously dangerously low, due to transportation problems, the additional requirements created by the African invasion struck its stocks very hard.

Another factor has been cold weather. Consumption in the East is always greater in the winter, because of the large volume of heating oil consumed. Some parts of New England have experienced severe cold spells recently. If similar weather continued through most of the remaining 3½ months of winter, there would not be enough heating fuel in the East although its use is rationed. Saving of transportation facilities for moving 60,000 barrels of gasoline per day, which requires approximately 250 tank cars, will make it possible to convert a part of this capacity to fuel oil.

Still another factor has been the 75,000-barrel-per-day decline in tank-car shipments, as these cars required repair work.

Everything combined to strike the East Coast hard at a very critical period, including the delay in allocating steel for building the big-inch pipe line and other overland facilities.

☆

In a single hour of cruising, a four-engined bomber burns as much gasoline as the family automobile uses in six months.

First Gas Rationing Week Not Typical

THE first full week of nation-wide gasoline rationing resulted in the addition of 1,688,000 barrels to stocks of this product. However, this should not be construed as being typical of conditions as they will exist under rationing. Several weeks must pass before judgment can be passed.

It must be remembered that practically every motorist filled his tank just before rationing became effective, as evidenced by the withdrawal of nearly 3,000,000 barrels during the preceding week. As a result, gasoline purchases were exceptionally small during the week ended December 12. Many car owners probably did not buy any gasoline at all last week.

The trend of gasoline stocks has been one of the surprises of 1942. Between the end of March and the first of December 31,000,000 barrels were taken from storage. In 1941 only 20,000,000 barrels were drawn from stocks in the corresponding period. In view of East Coast rationing and voluntary driving curtailment, the 11,000,000 barrel growth in withdrawal rate is amazing and very satisfactory. It leaves considerable empty storage space for additions in the future. The reason lies in the reduced volume of gasoline made by refiners. Between March and December of this year 383,000,000 barrels of gasoline were made, 19,000,000 barrels less than a year ago.

How Long?

IT HAS been the practice to figure during the past several years that if the additions to crude reserves each year equal the withdrawals each year, a pretty good job has been done. However, it is coming to be realized that additions to reserves in a given year, under conservation rules, may not be withdrawn for from 25 to 50 years, and that there will come a time when we will not be able to take out as much oil as will be needed within a year's period. How far away in the future such a time is, we do not know, but we believe that it can be charted. This week we asked the chief geologist of a major company how long, in his opinion, it would be before conservation laws have to be turned topsy-turvey to get a year's necessary crude requirements. He hazarded a guess of five to seven years. There are others who think that the critical period will come much sooner unless discoveries are made at a rate not now thought likely.

"Don't try to fool us. We know there is plenty of oil. You are in the army." This is what the Bixby, Oklahoma, draft board told a drilling contractor, who suggested that he might do more good if permitted to continue running his three rigs, or at least be allowed to complete the three tests now underway.

Not Much Oil in Synthetic Rubber

FROM a volume or weight standpoint, the petroleum industry will gain through synthetic rubber only a comparatively unimportant market, as the petroleum ingredients of the new rubber will account for less than one half of 1 percent of all petroleum produced and marketed. If the projected ultimate production of synthetic rubber were made up wholly of petroleum, only about 22,000 barrels a day would be required, out of nearly 4,000,000 barrels of United States total petroleum production. Actually, close to 20,000 barrels a day of petroleum will be required, as the petroleum ingredient butadiene represents about 75 percent of the weight of the rubber, while another ingredient, styrene, may be made from petroleum and increase the petroleum content close to 100 percent, the small remainder consisting of various chemicals. There are numerous oil fields in the United States which, individually, produce 20,000 barrels or more per day.

From the standpoint of value, however, the oil industry *will* gain an important market in the manufacture of synthetic rubber. The petroleum that goes into the rubber will bring one of the best returns received for any of the products made by the industry.

It is estimated that the finished product will be made for around 20 cents a pound when the presently scheduled production of 870,000 tons per year is reached. While that price is practically down to the 18 cents or so paid for natural rubber in recent years, it represents the greatest value of any synthetic organic product in the world. The total value of the year's production of rubber, at 20 cents, would be about $350,000,000, equivalent to nearly one fourth the price value for all crude oil produced in the United States in 1941.

While the 20 cents per pound will be the value of the finished rubber, about the same price would measure the value of the butadiene and styrene, for after those ingredients are made, relatively little processing cost is involved in obtaining the finished product.

On the basis of 20 cents a pound for petroleum in this form, the industry would be obtaining around $1.50 a gallon for it. It currently receives, in contrast, only about 32 cents a gallon for its highest-priced lubricants at the refineries and less than 7 cents a gallon for premium grade gasoline at Mid-Continent refineries. There are no quoted prices now on 100-octane-aviation gasoline, but when last quoted, the price was under 20 cents a gallon, although that product in its early development sold for over $1 a gallon and even a few years ago brought 40 to 50 cents a gallon.

The history of aviation gasoline prices indicates, incidentally, that the cost of making synthetic rubber ultimately may be brought down materially under the present estimated costs. In fact, it is now being predicted by oil industry chemists and economists that the cost of synthetic rubber will be brought down below 15 cents a pound.

Sabotage Warning

THE suggestion has come to THE OIL WEEKLY that operators be warned to keep an open eye for possible sabotage of their properties during the holidays. The thought has been expressed that efforts might be made to take advantage of possible laxness in vigilance and it is urged that every worker be on the alert for attempts to damage oil properties.

Applications Needed For Tubular Purchase

OIL producers seeking to buy oil country tubular goods from other oil operators must file applications therefor in the district office of PAW for their district before filing application with PAW in Washington, G. W. Orton, director of materials for PAW, Washington, advised C. E. Naylor, district director of materials for District 3, Houston, last week.

Before the Washington office will act upon the application it must be accompanied by a statement from the District PAW office to the effect that the requirement for oil country tubular goods covered by the application cannot be filled through the district office.

Orton also advised that PAW requests that all operators list all sales made to other operators with the District PAW office in which the sale was made in order that PAW records may be kept on a current basis.

WASHINGTON ROUNDUP

By B. F. LINZ
Washington Correspondent

Sale of Gasoline to Civilians Stopped in East Coast

Henderson Resigns as OPA Head

Sumner Pike Named Petroleum Adviser to OPA

THE gasoline industry in the District of Columbia and the 17 originally-rationed Eastern states were temporarily put out of business December 18 as a result of inventories dipping to extremely dangerous levels because deliveries have been failing by 60,000 barrels a day to meet demand. OPA on less than two hours notice, suspended all types of ration books except the "T" books granted public transportation and commercial vehicles.

The suspension, prolongation of which would result in the closing of important war plants in communities without public transportation, was of a temporary nature, and OPA officials immediately began work on a plan to resume deliveries without delay.

It was, possibly, merely a coincidence that the situation was not disclosed until a few hours after Congress had adjourned, not to meet again until January 6.

Well over two billion dollars has so far been spent or committeed by Reconstruction Finance Corporation for pipe lines, aviation gasoline and synthetic rubber, it was shown by a report to Congress. Nearly three quarters of the total is involved in the aviation-gasoline program. In addition, substantial but undisclosed sums have been expended in meeting the increased costs of transporting oil to the East Coast and to buy products for that area in District 2.

Eastern Gasoline Sales Stopped For All But "T" Coupons As Stocks Dwindle

AS GASOLINE deliveries failed under the impact of heavy heating and military demands to meet consumptive requirements of the East Coast, sales of this product were stopped to all but commercial and public transportation vehicles.

The first step to meet the situation was taken at 10:40 a.m. December 18, when OPA ordered sales of gasoline on all types of coupons except "T" cut off at noon of the same day.

At a press conference in session when the order was issued, President Roosevelt expressed hope that only a few days would be required to straighten the situation out and permit motorists to resume driving. The President explained that the suspension was necessary because gasoline shipments to American forces in North Africa had to be increased, and that it had drawn heavily upon already low Atlantic Seaboard stocks of petroleum.

The OPA order came after hours of rumor of a cut in the value of "A" coupons. Actually an order was scheduled for issuance on the night of December 17, but officials of OPA and PAW could not agree on its phrasing.

News if the impending cut, however, created a rush of motorists to filling stations on the morning of the 18th, and when the "curfew" sounded at noon, there were still thousands besieging the gas pumps.

Under the order each motorist could cash one coupon of any type for "emergencies," but there was no indication immediately what constituted an emergency or how the cashing of more than one coupon at different stations was to be prevented. In the New York-Washington area, however, operators were ordered not to sell to any motorist with three gallons or more in his tank.

Contributing to the situation was a further decline in tank-car deliveries of 30,959 barrels daily during the week ended December 12, during which receipts ran 736,099 barrels a day. However, the weekly PAW report explained, the actual decline was 8000 barrels less, since with the completion of pipe line facilities from Lima, Ohio, to Buffalo, N. Y., that much oil which formerly was loaded in Lima began to move from Buffalo but was not counted in the rail delivery because it originated in District 1.

Causes of the drop in the movement, it was said, were the cold weather in the Midwest and the freezing of water in the bottom of some of the tank cars, which required thawing.

Terminals now have been designated in the six East Coast zones to handle oil under the pooling arrangement. Bright spots in the picture were the announcement that, as of December 10, only 32 miles of the first leg of the big-inch pipe line remained to be laid, with a possibility that oil may begin to move late next month, and the report that industrial conversions are saving 29,410,828 barrels and household conversions, 5,040,000 barrels of oil annually.

The serious gasoline situation, long anticipated by PAW officials, broke into print December 17 with an announcement by New York's Mayor LaGuardia that his city was down to one day's supply, made in a telegram to OPA in which he asked that sale of motor fuel in New York be halted immediately.

The shortage was general throughout the highly populated section between Washington and New York. Gasoline receipts, it was said, are currently sufficient only to meet absolutely essential requirements, and consumption is exceeding deliveries by 60,000 barrels a day, with the inevitable result that stocks have declined to critically low levels.

PAW officials pointed out that as long ago as November 5, Ickes notified Henderson that consumption of all oils in the East should be reduced by 139,000 barrels a day, with 80,000 barrels of it gasoline, if the drain on inventories was to be halted, but it was not until December 2 that OPA took any action, reducing the value of "A" coupons from four to three gallons.

The situation is expected to continue until the close of the heating season, since no deliveries through the now-building first leg of the big-inch pipe line can be expected before February.

A determination of availability by PAW disclosed that there will be even less oil available on the East Coast next month than at present.

Figures covering the remainder of

this month and all of January were released, showing that gasoline available for distribution will amount to 365,000 barrels per day through December and 331,000 barrels in January; kerosene, 184,000 barrels this month and 167,000 barrels in January; distillate fuel oil, 340,000 barrels this month and 338,000 next; and residual fuel oil, 282,000 barrels this month and 281,000 barrels next, a total of 1,171,000 barrels for December but only 1,117,000 barrels for next month.

The December over-all figure approximates two thirds of the amount consumed a year ago, it was said, and the 365,000 barrels of gasoline compares with a daily consumption under rationing of 450,000 barrels; prior to rationing consumption was 600,000 barrels.

All figures are exclusive of aviation gasoline and export demand.

Explaining the figures, Deputy Administrator Davies said, "This supply represents all that can safely be made available for the period, considering transportation facilities and inevntory position. Even this is not guaranteed. Military demands must come first; we have met them in full to date and we must continue to do so.

"If we should be called upon between now and January 31 for any large volume additional to amounts which the military forces have notified us will be required, then the figures now issued would need to be revised downward.

"The supply position, as now determined, provides sufficient petroleum products to meet in full military orders, to keep war industries supplied and to meet minimum requirements for home heating through the Atlantic Seaboard area. It is not sufficient to meet the recent rate of gasoline consumption. Lesser quantities of gasoline must suffice if we are to meet more critical military, industrial and home demands. The rate of gasoline consumption over the past has been in excess of the genuinely essential requirement and the public is called upon to make the required adjustment.

"While the supply situation is more acute in some sections than in others, it should be recognized that a decrease in gasoline consumption anywhere in the Eastern Seaboard area will operate directly or indirectly to release transportation facilities needed to equalize the situation and to meet the demand at critical points.

"The disruptive effect of restrictions upon petroleum supply and the discomfort which they entail is very much upon the mind of the petroleum administrator. It is for this reason that our forces are devoting themselves unsparingly, day and night, to increasing the supply. With the cooperation of ODT, the petroleum industry and the railroads, great progress has been made and greater hoped for, but there are definite physical limitations.

In support of the OPA policy, Lieutenant General Brehon B. Somervell, chief of the services of supply, issued an appeal to the public to save gasoline and fuel oil to provide the power necessary for the mechanized might that will crush the Axis."

"Thousands of tons of gasoline and fuel oil were needed for the initial stages of that campaign," he said. "Thousands more are needed for every day's fighting. One heavy bomber cruising 250 miles in an hour, uses 200 gallons. Tanks of a mechanized division burn more than ten thousand gallons in traveling 100 miles.

"The total necessary in North Africa is enormous. The supply, at that distance, is limited. Many tankers are needed to transport the army's oil requirements. Only by the combined savings of millions of Americans, in motoring and in heating, can enough gasoline and oil be diverted to meet the army's demand."

In a formal statement, OPA expressed the hope that it could develop an integrated plan for handling the gasoline problem to get it into effect by December 21.

New England Congressman Critical of Efforts to Supply Fuel Oil

FAILURE of the government to move promptly and efficiently to meet the threat of an oil shortage is responsible for the imminent possibility of a heating-oil famine in New England, it was asserted December 14 in a report of the New England members of Congress who earlier this month investigated the situation.

As a result of its inquiry, the group developed that unless there is a considerable increase in shipments into the northeast within 60 days, "we will have used all available inventories on hand and be down to an unsafe level."

This conclusion was based on estimates that present inventories run between 9,500,00 and 11,000,000 barrels, the danger point on stocks is 5,000,000 barrels, and only about 220,000 barrels a day is being delivered against a requirement of 320,000 barrels daily.

Specifically, the group listed three major reasons for the present situation:

1. The lack, until December 2, of an oil coordinator with power and authority to compel the delivery of needed products to areas like New England where it was apparent a famine was developing.

2. The failure to build the pipe lines that were authorized by Congress in July, 1941, which, if immediately constructed, would now have been in full operation, making available more tank cars for the New England service.

3. The slowness and "unjustifiable delays" in making decisions and in carrying out directives by OPC, ODT, OPA and WPB.

The New Englanders charged that prior to establishment of PAW, "there were amazing conflicts in the views, opinions, and delegated authority—if any—to the various governmental agencies charged with the expeditious solution of this problem.

"It will surprise the people of New England, who have not been in close touch with the situation, to learn that OPC has had no authority hitherto to order or direct any producers of oil to direct rail shipments to New England. Its efforts have been confined to using its good offices to make recommendations. It had no authority to compel or enforce the diversion of petroleum products from one area to another. This lack of authority has been apparent to all interested for many months. For more than nine months, continuously and repeatedly, efforts have been made to induce the Chief Executive to establish a nation-wide authority to control the distribution of petroleum products. Nearly every member of the New England delegation has requested this power and has been promised that it would be done. It is remarkable that conditions are not worse than they are, in view of the absence of any real official power to act. The naming, on December 2, of a so-called 'oil czar' with greater authority should tend to improve the situation, for it at least fixes definite responsibility and grants the necessary power to act."

Other major factors in the problem, they said, are the failure of the government program for conversion, the lack of sufficient tank cars and the constant need of repairs to the cars, which are old and were never intended for continuous, high-speed service, and statements of government officials that 75 percent of oil requirements would be supplied, which led people to believe that they would receive that much oil.

"It is obvious, from the facts as outlined above, and from the evidence pre-

sented to the committee, that New England will have a dire and dangerous shortage of residual or bunker oil and domestic heating oil during the coming winter unless steps are taken immediately to increase the supply," it was declared.

"The committee considers that the rationing plan at long last in effect all over the United States since December 1 should help New England, but it is extremely unfortunate that its inauguration was so long delayed. In no other way that this committee can ascertain can more fuel oil be had in New England except by the use of more tank cars and barge transportation on the New England run.

"The Office of Defense Transportation gives little encouragement that there can be any substantial increase in petroleum shipments by rail to New England because of the general transportation situation throughout the country and the possible increased military needs.

"It is hoped that placing the principal control of petroleum products under one head and granting the authority necessary will remove the confusion formerly caused by conflicting statements and directives issued by the heads of various bureaus and their subordinates.

"The committee believes that the public should be informed that even under the most favorable circumstances there will be a drastic shortage of petroleum products in New England this winter."

The committee estimated that heating oil available might be as little as 50 percent of normal requirements in the area, but said some officials had placed it at as low as 40 percent.

Disney Warns That Question of Oil Supply Will Be Greater in Future

IN THE House, Representative Disney of Oklahoma warned that oil will become an even greater problem in the coming year and declared that unless production is increased there will not be sufficient oil to heat homes, run factories and provide transportation for the civilian population.

Disney charged that the government, instead of encouraging the industry, has raised many difficulties during the past year. He did not place the blame on any specific agencies, but there was no doubt he was aiming at OPA, which has refused to revise its price schedules, and WPB, which long stood in the way of operators needing materials.

Estimating that above-ground stocks amount to 439,000,000 barrels, or 35 days crude and 40 days refined stock after deducting working stocks, Disney told the house: "It is conservatively estimated that our demands will be increasing during the coming year to 4,670,000 barrels per day. It is hoped that the supply from all sources can be increased to 4,452,000 barrels per day.

"I have found no one who will seriously even contend that we can reach and maintain that rate of production of oil produced and delivered. Even if it were reached and maintained, we would still be drawing on our above-ground stocks at the rate of 213,000 barrels per day.

"The figures I have given you are extremely conservative. We now have less than 20 percent of our projected military forces in the foreign theatres of war. Up until recently we have conducted a defensive war. Now that we are ready for an offensive effort our resources must be multiplied many times.

"If we are running into an oil shortage with only 20 percent of our overseas army engaged, what will the story be when several millions more of soldiers are across?"

Even with this situation facing them, the congressman said, the various government departments have been working at cross purposes.

"On the one hand, the oil industry is urged to make further exploratory efforts and by another division it is told that it cannot have materials with which to operate," he explained. "It has been required to increase the production and distribution of certain products by one division of government and by another has been prevented from recovering the cost of such operations. It has been required to increase its production of petroleum in order to furnish quantities sufficient to make products for synthetic production of other war essentials of which we have a shortage. During all of this time it has been threatened by other branches of government with the removal of the present provisions of the tax law with relation to the depletion allowance. There has been confusion of demands, directives and obligations. This situation should not be tolerated."

Disney expressed the hope that Ickes, now administrator rather than coordinator, will take advantage of his increased authority to set up a national oil policy, but, he threatened, "If a definite program is not announced at an early date, indicating definite progress along these lines, I expect to come back to this body with plans to effect these purposes so that the petroleum industry may no longer be hampered in its efforts to supply the petroleum products so essential to the conduct of the war."

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HENDERSON OUT: Resignation of Leon Henderson December 17, only a few days after President Roosevelt denied reports that his price administrator was quitting, paves the way for the first major change in price and rationing policies since OPA was set up.

Henderson, who has been in poor health for some time, probably will not relinquish his post until some time next month, after the Senate has had an opportunity to confirm his successor, generally expected to be recently defeated Senator Prentiss M. Brown of Michigan.

The change in officials will eliminate difficulties which OPA was facing in securing funds for operation. Henderson, whose brusque manners never have set well with Congress, has recently been under intensified attack because of his gasoline and heating-oil programs, and there has been definite statements that further funds would be blocked if he remained at the head of the agency.

Brown has been numbered among the critics of OPA policies and, if appointed, is expected to seek to eliminate some of the irritations which have been caused by the plethora of instructions, often conflicting, and the volume of reports required under the various rationing programs.

It is not believed that Henderson is entirely out of the picture. He will require treatment and rest for several months, but there is no doubt a place will be found for him in the government organization when he feels physically able to resume work.

Pike OPA Adviser

Appointment of Sumner T. Pike, Securities and Exchange Commissioner, as special adviser on petroleum matters, was confirmed by Henderson December 16.

Pike's service will be only temporary, and apparently will be for the purpose of settling the long-pending question whether there should be an increase in crude oil prices. At the same time, he will serve as director of the fuel-price division until a successor can be secured to Dr. George W. Stocking, who

[*Continued on page 51*]

November Wildcatting Fails to Provide Adequate New Fields

By L. J. LOGAN, Associate Editor

UNFAVORABLE results in wildcatting continued in November, as the total number of exploratory tests completed was only about 75 percent of the monthly average set up by OPC as the goal for prospecting this year, while the wildcats actually drilled were disappointing. They failed to prove productive in as large a proportion as that contemplated by the government in its calculations, and moreover, the too-few new fields and new pays which were found apparently were predominantly of relatively low rating, with few if any major strikes included.

Two thirds of the new oil fields and new pays found were in states and districts where discoveries most frequently represent limited reserves, namely, Illinois, Indiana, Kansas, North Texas, West Central Texas.

Meanwhile, despite considerable wildcatting, no oil discoveries whatever were made in California, Arkansas, Mississippi, New Mexico, Eastern Texas, the Upper Gulf Coast of Texas, the Louisiana Gulf Coast, Michigan and Kentucky.

In setting up a program of minimum necessary drilling for this year, OPC (now PAW) recommended that the industry be assigned materials enough to drill at least 19,000 wells, which should include 4000 wildcats, and it assumed that the 4000 wildcats should include 624 finding oil production, 116 gas production, and 3260 dry holes. Those figures are equivalent to averages of 333 total wildcat completions per month, of which 52 should produce oil, 10 gas, and 272 be dry holes.

As compared with the 333 wildcat completions per month desired, there were in November only 244 (73 percent of the goal), as reported in the weekly completion lists in THE OIL WEEKLY. The 244 completions compared with 235 in October.

Both the subgoal volume of wildcatting and subnormal success of drilling were responsible for the fact that discoveries fell far short of hopes. Instead of the desired 52 oil wells, the month's discoveries, included only 29 (18 new fields and 11 new pays), and represented only a 56 percent fulfillment of the goal. OPC had figured that 15 percent of the wildcats drilled would produce oil, but actually, in November, only 12 percent did.

Better results were achieved as regards gas fields, as there were 8 discoveries, compared with the 10 per month called for by the government. In October there had been only 5 gas field discoveries.

Among the more important discoveries of November (see accompanying table for details) were the 1 new oil field and 1 new pay in West Texas. The new field is Robertson in Gaines County, producing from Permian lime at 5010-5950 feet, but more development is needed to fix the value of this "deep" strike, which is subnormal in initial production for the depth involved, having flowed 80 barrels of 26-gravity oil in 6 hours, including accumulation. The field, on an anticline, was found through geophysics and subsurface geology from nearby regular Permian failures. Possibly more important in West Texas was discovery of the Clear Fork (Tubb) sandy lime pay (Lower Permian) in the Monahans field, Ward County — first Clear Fork in the county and quite probably the forerunner of a major oil strike, in view of the good body of gas overlying the thick oil zone. The discovery well flowed 759 barrels of 34-gravity oil and 26 barrels of sulphur water per 24 hours after acid treatment through perforations at 5633-5643 feet. The field previously was proved in Ellenburger at 10,345 feet.

The Lower Gulf Coast of Texas furnished three typical discoveries, all in Jackson County: a deep, high-gravity-oil field, a similar deep new pay, and a shallow oil field.

North Texas scored a high proportion of successful wildcats, having gained 3 new fields and 4 new pays from completion of 21 tests. However, the areas opened are mostly of minor importance. Two new Mississippian lime pays in Young County, at depths of 4500 to 4800 feet, are among the more promising discoveries.

West Central Texas furnished a shallow oil discovery of minor importance and a shallow gas field. Gas is urgently needed in the area due to Army camp needs, but with compulsory wide spacing, not much drilling can be assigned this type of gas pool and still stay on structure.

Among the more important discoveries of November was the opening of oil production in the Tensleep (Pennsylvanian) zone in the Elk Basin field, Park County, Wyoming. The discovery well flowed 80 barrels of 30-gravity oil per hour from 4500-foot pay. Light oil production from Frontier sands at Elk Hills has aggregated over 11,000,000 barrels. Wyoming also gained a new field, Horse Creek, in Laramie County, when a wildcat pumped 586 barrels daily from Lakota sand (Cretaceous) at 5451-5510 feet.

Results of Wildcatting in the United States in November, 1942

This report embraces approximately one full month's wildcatting, although not exact results for calendar month. It includes some wells completed in late October, but omits some completed in late November.

State or District	PRODUCTIVE WILDCATS: New Oil Fields	New Oil Pays	New Gas Fields	Total	Wildcats Failures	Total Wildcats
Successful:						
Arkansas	..	..	1	1	2	3
Illinois	1	4	..	5	33	38
Indiana	1	..	..	1	5	6
Kansas	4	..	..	4	28	32
Louisiana:						
North	1	..	1	2	7	9
South	..	..	1	1	2	3
Michigan	..	..	1	1	17	18
Montana	..	..	1	1	..	1
Oklahoma	1	..	1	2	15	17
Texas:						
North	3	4	..	7	14	21
West Central	2	..	2	4	5	9
West	1	1	..	2	6	8
Lower Coast	2	1	..	3	11	14
Southwest	1	..	..	1	12	13
Wyoming	1	1	..	2	..	2
Sub-Total	18	11	8	37	157	194
Unsuccessful:						
California	..	..	..	..	10	10
Florida	..	..	..	..	1	1
Kentucky	..	..	..	..	5	5
Mississippi	..	..	..	..	6	6
Missouri	..	..	..	..	1	1
New Mexico	..	..	..	..	5	5
Texas:						
Eastern	..	..	..	..	4	4
Upper Coast	..	..	..	..	9	9
South Central	..	..	..	..	9	9
Total U. S. in November	18	11	8	37	207	244
Total U. S. in October	33	12	5	50	185	235
***Monthly Averages Sought by Government for 1942 (OPC goals)**	52	..	10	62	272	333

* OPC program called for 4,000 wildcats in 1942, including 624 to produce oil, 116 gas, and 3260 dry holes.

New Oil and Gas Fields and New Pay Horizons Discovered in the United States in November

This report embraces approximately one full month's discoveries. It includes some wells completed in late October but omits some completed in late November.

County	Field	COMPANY, WELL AND LOCATION	Miles from Nearest Field	Miles from Pipe Line	Date Spudded	Dated Completed	Total Depth (Feet)	PRODUCING FORMATION: Completion Horizon (Feet)	PRODUCING FORMATION: Name, Kind and Age	INITIAL PRODUCTION: Method	INITIAL PRODUCTION: 24-Hr. Rate, Bbls. Oil	INITIAL PRODUCTION: 24-Hr. Rate, Bbls. Water	INITIAL PRODUCTION: Choke (Inch)	Gravity of Oil	Type of Structure	Method of Discovery
		Arkansas: New Gas Field														
Pope		Ark. La. Gas Co.'s Ladd-Strong 1, SW SW 22-10n-21w				11- -42	2800	2500 & 2800			*17					
		Illinois: New Oil Fields (October)														
Jefferson	Coil West	Gulf's Bradford 1, NW SE SW 14-1s-4e			8-23-42	10-13-42	2981	{2791-2797 2854-2860	Leviss li., L. Miss. McClosky li., L. Miss	Pump	15	30				
		Illinois: New Pays (October)														
Clinton	Boulder	E. F. Jones' Harrison 2, C SE NW 2-2n-2w				10- 6-42	2670	2584	Lime, Devonian	Flow	341	38				
Gallatin	Inman East	Cherry & Kidd's Kerwin 5, NE SE SW 11-8s-10e			10- 5-42	11- 3-42	2057	1725	Clore, Tar Spgs. Sands, Up. Miss.	Pump	177	15				
Hamilton	Rural Hill	Gulf's B.W. Johnson 1, NW SW SW 17-6s-7e			9-16-42	10-27-42	2755	2707	Cypress sand, Up. Miss.	Pump	30					
Jasper	Boos North	Pure's Swick Cons. "A" 1, C SE NW 20-6n-10e				11- 3-42	2858		Rosiclai sn., McClosky li., L. Miss.	Flow	748					
Lawrence	Lawrence So.	S. Malis et al's Ireland 1, SW SE NW 27-2n-12w				11- 3-42	2005	1995	Bethel sand, Up. Miss.	Pump	70	15				
Wayne	Geff	Ohio Oil's J. W. Weaver 1, NE SW NW 13-1s-7e			9-10-42	10 -6-42	3089	3072	Aux Vases sn., Up. Miss.	Pump	97					
Wayne	Aden	Texas Co.'s H. Silverman 5, C NE NW 16-3s-7e			8-27-42	10-20-42	3340		Aux Vases sn., McClosky	Pump	141					
		Illinois: New Oil Field (November)														
Edwards	Ellery, N.	Stanolind's Broster 1, SE SE NE 7-2s-10e	1½		9- 7-42	11-10-42	3496	3440	McClosky lime, L. Miss.	Pump	35	70		37.6		
		Illinois: New Pays (November)														
Clay	Iola	H. Luttrell's Reed Heirs 1, SE NW NE 15-5n-5e				11-24-42	2306	2292	Bethel sand, U. Miss.	Pump	82			36.0		
Wabash	Friendsville	Skiles' Smalley 2, SE SE NE 3-1s-13w			10- 3-42	11-17-42	2325	2314	Cypress sand, U. Miss.	Pump	176			35.2		
Wayne	Boyleston	Gulf's P. Carter 1, C E½ NE SW 2-2s-7e			10-17-42	12- 1-42	3300	3214	Levias lime, L. Miss.	Pump	19	1				
Wayne	Coil	W. C. McBride's S. Gregory 1, NW NW NE 30-1s-5e			9- 7-42	12- 1-42	3056	2978	McClosky lime, L. Miss.	Pump	4	11				
		Indiana: New Oil Field														
Posey	Honey Lake	C. E. Brehm's Hardwick 1, SE SE SE 12-8s-14w			9-24-42	10-28-42	1135	1095-1105	Pennsyl. sand	Pump	24	200				
		Kansas: New Oil Fields														
Barton		Phillips Petroleum Co.'s Frieb 1, SEC SW 33-17-14w				11- -42	3451	3441-3451	Arbuckle lime		47					
Butler		Deep Rock Oil's Eckels 1, CSE NW 32-29-4e				11- -42	2956	2951-2956	Arbuckle lime		?					
McPherson		Falcon-Seaboard-Globe Oil's Bean 1, CW½ SE SW 25-17-4w				11- -42	3406	3401-3406	Viola lime		3,000					
Stafford		Vickers Petroleum's Curtis 1, S½ SW NW 6-22-13w				11- -42	3700	3693-3700	Arbuckle lime		3,000					
		North Louisiana: New Oil Field														
Catahoula	Manifest	Eugene Jordan's La. Central 1, C NE SE 22-9n-5e				11- -42	4554	1810-1817	Sparta-Wilcox sn., Eocene	Pump	72					
		North Louisiana: New Gas Field														
Winn	Calvin	Hunt Oil Co.'s Goodpine F-24, CSW SE 13-12n-5w		14	3- ?-42	10- -42	9720	5784-5794	Palx., Nactch., Woodb. sn., Cret.		*2.1		¼			
		South Louisiana: New Gas Field														
LaFourche	Bully Camp	Gulf's Delta Securities 1, SEC 1-19s-20e			9-14-42	11-11-42	1496	994	Miocene sand		*.75		$\frac{3}{16}$		Salt dome	Surf. geol.—drlg.
		Michigan: New Gas Field														
Arenac		Don R. Rayburn's Mee 1, CNW NW 4-19n-3e		4	8-22-42	11-20-42	1640	1600	Berea sny. li., Miss.		*.6					Trend
		Montana: New Gas Field														
Pondera	Conrad Butte	R. C. Tarrant's McCracken 1, CSE NW 12-29n-1w				11 --42	755		Colorado shale		*.5					
		Oklahoma: New Oil Field														
Pawnee		E. W. Whitney's Arnold 1, SW SE 26-22n-6e				11- -42	2685	2646-2685	Prue sand		35					
		Oklahoma: New Gas Field														
Texas		Cabot Carbon's Ennis 1, CE½ 4-2n-15ecm				11- -42			Herrington-Ft. Riley li.		*18					
		North Texas: New Oil Fields														
Montague		R. C. Lipscomb et al's Harmon-Vaughn 1, Winters Sur. A-842	4½	4½	8-17-42	11-20-42	4982	3859-3865	Strawn sny. li., Penn.	Pump	150			29.7	Anticline	Geology.
Montague		Sinclair-Prairie's J. H. Eaves 1, Bench Sur. A-1521	7⅔	5	7- 8-42	10-28-42	7070	{5828-5840 & 5912-5922	Bend conglom., Penn.	Flow	70		1	41.2	Anticline	Geophysics.
Young	Holbert	Std.OilCo.(Tex.)Hanlon-Buchanan's Holbert 1, Sec. 726, T. E. & L. Co.	1½		8- ?-42	11- -42	5236	3857-3862	Bend lime, Penn.	Flow	136		½	39	Anticline	Geoph.—subsurf
		North Texas: New Pays														
Jack	Bryson	Hill & Hill's Clayton Bros. 5-B, L. Knight Sur. A-324				11-17-42	5435	4654-4671	Marble Falls li., Penn.	Pump	20	50		40	Anticline	
Throckmorton		Humble's J. B. Mathews 1, A Tarter Sur. A-824			8- ?-42	11- -42	4613	4597-4611	Miss. lime, Miss.	Pump	85	109		40	Anticline	Deep prosp.
Young	Knox	Mudge Oil's W. B. Harrison 10, T. E. & L. Sur.			8-31-42	11-11-42	4770	4764-4770	Miss. lime, Miss.	Flow	1184		$\frac{7}{16}$	43	Anticline	
Young	Murray	Std. Oil Co. (Tex.) Hanlon-Buchanan's S. P. Donnell 1, T. E. & L. 2371		4	9-15-42	11- -42	4503	4466-4503	Miss lime, Miss.	Flow	686		¾	43.2	Anticline	
		West Central Texas: New Oil Fields														
Callahan		Anderson-Prichard's Sealy-Smith 1, G. H. & H. 121, Blk. 2	4½	¼	9-15-42	11- 2-42	3064	3051-3055	Morris sand, Penn.	Pump	88	34		40	Anticline	Geology.
Shackelford		R. H. Roark's County Poor Farm 1, Blind Asylum Lands	1	1	9-22-42	11-10-42	827	821- 827	Cisco sand, Penn.	Pump	6			38	Anticline	Geology.
		West Central Texas: New Gas Fields														
Brown		Central Tex. Gas Co.-J. B. Whitesides' E. E. Kirkpatrick 1, Jno. Greenwood Sur. 155	5	5	10- ?-42	11-20-42	1458	1287-1450	Ranger lime, Penn.		*.25		2		Anticline	Geology.
Brown		Wm. D. Austin et al's T.S.Williams 1, SW SE SE Sec. 40, H. T. & B.	1(from oil fld.)		10- 9-42	11-21-42	1437	1358	Cisco sny. li., Penn.		*.26				Anticline	Geology.
		West Texas: New Oil Field														
Gaines	Robertson	Texas Co.'s J. B. Robertson 1, CNW NE PSL Sec. 25, blk. A-21	2½		5-29-42	11- 9-42	7686	5910-5950	Holt or Glorietta li., Perm.	Flow	321			26	Anticline	Geoph.—subsurf
		West Texas: New Pay														
Ward	Monahans	Shell Oil Co.'s Sealy-Smith FDN 2, G.MMBA Sec. 38, blk. A			7-22-42	11-11-42	5741	5633-5643	Clear Fork sny. li., L. Perm.	Flow	759	26	2	34	Anticline	
		Lower Texas Coast: New Oil Fields														
Jackson	Collier	The Texas Co.'s Collier 2, James Kerr Sur. A-39			11- 4-42	11-16-42	2455	2435	Catahoula sn., Mio.	Flow	202		$\frac{11}{64}$	23.6	Faulted	Geophys.—drlg.
Jackson	Mustang Creek	Guy I. Warren's O. W. Freeman 1, Wm. Menefee Sur. A-53	1½		10-21-42	11-16-42	6651	6641	Frio sand, Olig.	Flow	115		$\frac{7}{64}$	31.8	Faulted	Geophys.—drlg.
		Lower Texas Coast: New Pay														
Jackson	Lolita	Tide Water's L. Ranch Co. 1, I. & G. N. Sur. 19			8- 5-40	11- 2-42	5946	5716	Marginulina sn., Olig.	Flow	121		½	28.9	Faulted	
		Southwest Texas: New Oil Field														
Atascosa	Imogene	Humble Oil's M. L. Thompson 1, Peter McGreal Sur.			7-31-42	11- 5-42	7576	7570	Edwards li., Cret.	Pump	38			38.7		Drlg.—surf. ind.
		Wyoming: New Oil Field														
Laramie	Horse Creek	General Pet. Corp.'s Govt. 78-31-G, SW SE SE 31-17n-68w	50East	15	9-26-42	11-13-42	5531	5451-5489	Lakota sand, Cret.		586			31		Seismograph.
		Wyoming: New Pay														
Park	Elk Basin	Minnelusa Oil Corp.-Yale Pet. Co.'s Henderson 1, NE NE NE 31-58n-99w				11- -42	4538	4488-4538	Tensleep, Penn.		1320			30		

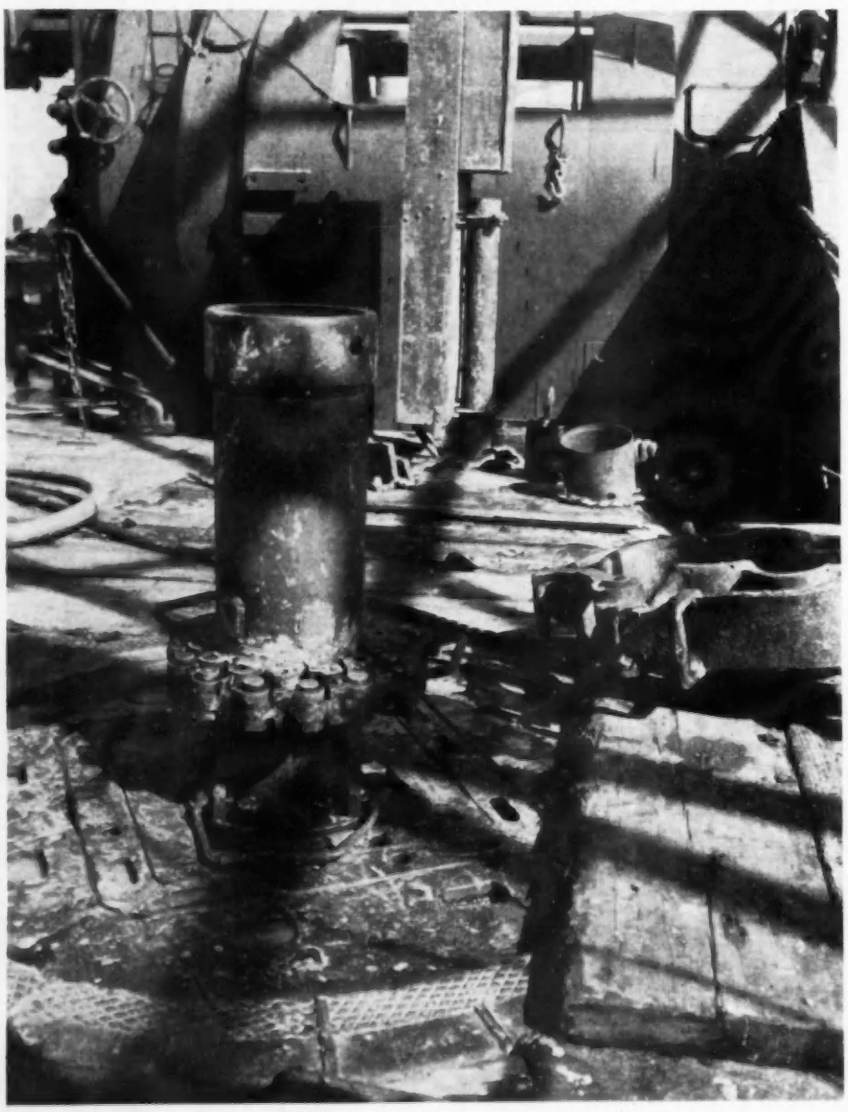
* Million cubic feet gas.

Improved Casing Recovery Method Reduces Cost

By WARREN L. BAKER, Editor

A NEWLY developed procedure for pulling casing from non-productive wells has many advantages over conventional methods, because more casing can be recovered at less cost per foot. The outstanding feature of the new method is the decided saving in time, which is the main item of expense in any casing-pulling job. With casing becoming increasingly difficult to procure, salvaging of usable material is extremely important. Therefore, this new method represents a major advancement in answering the urgent wartime problems of obtaining sufficient casing to prevent collapse of drilling operations necessary in providing new oil supply sources. The method described here is applicable to new holes which do not prove to be commercial producers and where the drilling rig and derrick are still at the well.

Although under ordinary conditions operators would not favor spending more money to recover casing than what they would have to pay for new casing, at the present time the amount of new steel available is so reduced that it is necessary to salvage as much pipe as possible, even in some cases where the cost may be greater than the price of the new casing. Also, it is believed that additional experience with the method described here will reduce the cost even below that shown in the examples and that greater portions of the total casing strings can be recovered at a cost comparable to the original price of the casing.



The wash pipe, supported in slips in the rotary table, is provided with safety clamp to guard against possible loss down the hole, as the slips not only support the wash string, but also the weight of the fish as each joint is broken out and laid aside.

The Improved Method

Briefly, the method which was developed by Stanolind Oil & Gas Company with the cooperation of Brown Oil Tools, Incorporated, consists of making a series of cuts at pre-determined intervals with one trip into the well, then going in with a wash-over string and recovering each section of cut casing without withdrawing the string from the hole. When the recovered casing is being removed, the wash-over pipe is suspended from slips and the casing is withdrawn through it.

Advantages of New Method

This method of recovering casing from dry holes has the following advantages over methods formerly used:

1. Rig time spent in breaking down and picking up the wash pipe is very greatly reduced.
2. Rig time is further reduced by making all of the cuts before washing operations are started.
3. The rental on wash pipe and spec-

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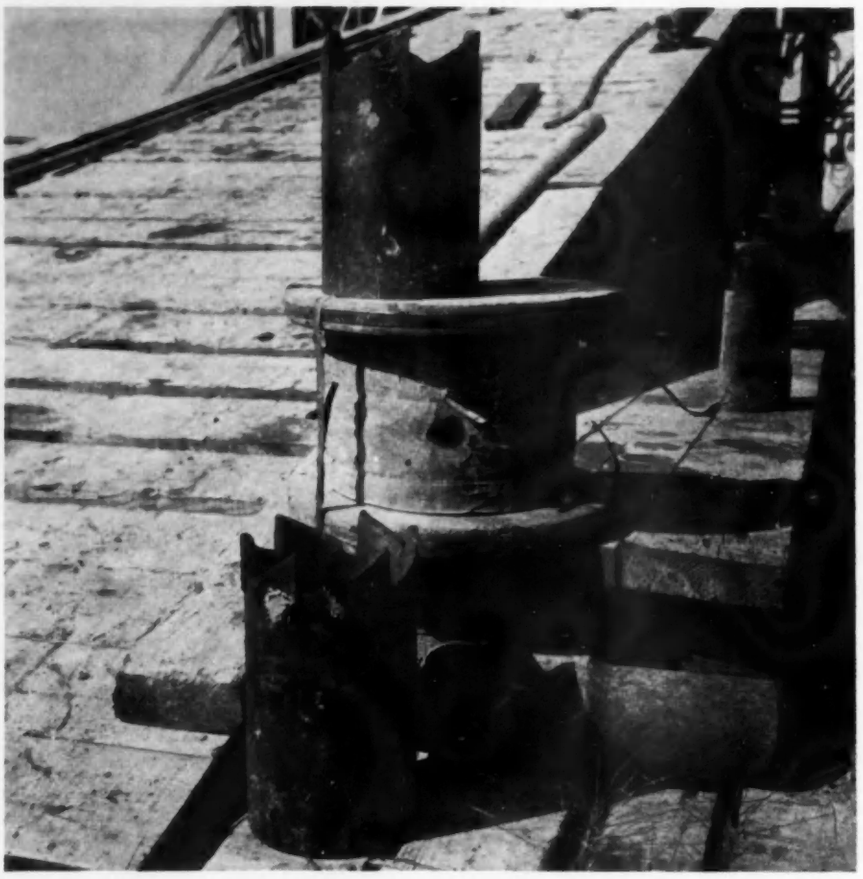

Two of the spare shoes provided for use on the wash-over pipe in case renewal is indicated during the progress over each of the cut "fish" remaining in the hole.

ial tools is reduced through decreased rig time.

4. There is less expense of conditioning mud due to the smaller number of trips into the hole and the shorter time required for the entire operation.

5. More casing can be recovered at a cost equivalent to or less than the value of the casing.

Development of the Method

When its Brundrett 2, Chenango field, Brazoria County, proved to be non-productive, Stanolind Oil & Gas Company decided to recover as much of the casing as possible, even though the cost of doing so should prove to be greater than the value of the casing recovered. In this well a 9788-foot hole was drilled and 8600 feet of 5½-inch casing was set with 528 sacks of cement. The theoretical top of the cement was at 7015 feet. Seven and five-eighths-inch flush-joint wash pipe was used and only 450 feet of it was available, which limited the amount of casing that could be washed over at a time. Cuts were made at 4000, 3560, 3122, 2684 and 2246 feet. After the last cut was made it was found that the balance of the casing could be pulled, so it was removed. Then the 7⅝-inch wash-over string was run in and the shorter sections were washed over and removed. After recovering casing down to 4000 feet, the cutting tool was run in the hole and a cut made at 4468 feet, then the wash pipe was run, the casing was washed over and pulled. In like manner pipe was cut and recovered to 4925, 5375 and 5831 feet. The total cost on this job was $10,355 which was 210 percent of the original cost of the casing which was recovered.

Considerably more casing was recovered from Brundrett 2 than could have been obtained by shooting and pulling and it was felt that improvements in the method would reduce the cost so it was decided to recover as much casing as possible from Huebner 2, Lucky field, Matagorda County.

In this well 8980 feet of 5½-inch casing was set with 528 sacks of cement. The casing was cut at 5000, 4000, 3000, 2000 and 1000 feet, and slightly over 1000 feet of 7⅝-inch flush-joint wash pipe was used with an overshot between the first and second joint from the top. On this job, when the top of the fish was raised to the derrick floor, the 7⅝-inch wash pipe was unscrewed from the overshot and suspended from slips while the 5½-inch casing was pulled through it, unscrewed and laid down. Then the overshot was screwed back on the wash pipe and the next section of casing was washed over. Five thousand feet of casing was recovered at a total cost of $4,510.00 which was only 7 percent more than the original cost of the casing recovered.

Recovery of a large amount of casing from Huebner 2 at a cost approximately the same as the original cost of the casing led to the decision to attempt to recover casing from wells where 7-inch casing was run. It was decided to attempt to recover the casing in shorter sections on account of the smaller clearance between the casing and the 9⅞-inch hole originally drilled. At Gladys City 105, Spindletop field, Jefferson County, the top of the cement was calculated at 3500 feet, and 3215 feet of casing was recovered. Casing was cut at 2000, 1800, 1600, 1400 and 1200 feet and the various sections were washed over and recovered. Then cuts were made at 2800, 2600, 2400 and 2200 feet and the sections were washed over and recovered. Final cuts were made at 3215 and 3000 feet and the casing was recovered. In recovering the last section several stringers of cement were encountered. The total cost of this job was $1.52 per foot of casing recovered compared to an original cost of $1.20 per foot for the casing.

At Davidson 1, Big Hill area, Jefferson County, 8738 feet of 7-inch casing was set inside 3500 feet of 10¾-inch surface casing. The casing was cut at 500-foot intervals from 6500 to 3500 feet. The top 3500 feet was pulled as one section and two 500-foot sections

TABLE 1

Comparison of Number of Operations and Time Required to Recover 5000 Feet of 5¼-inch casing in 1000-foot sections with the improved and conventional methods.

OPERATION	Number of Operations		Est. Time Hour Per Operation
	Improved Procedure	Conventional Procedure	
Assemble cutting tool	1	5	2.0
Trips in hole to cut casing	1	5	1.5
Making cuts	5	5	1.0
Trips out of hole with drill pipe and cutting tool	1	5	1.0
Break off cutting tool	1	5	1.5
Pick up 1000 feet 7⅝-inch flush-joint wash pipe	1	5	3.0
Trips in hole with wash pipe	4	4	2.0
Pull wash pipe up to rotary and set in slips	4	..	1.5
Pull all of wash pipe out of hole and standback	1	5	5.0
Total Operations	19	39	
Total Hours	33	83	

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down to 4500 feet were recovered, using 9-inch washover pipe with a 9⅝-inch rotary shoe on bottom. Due to the slow progress made in working the wash pipe from 4000 to 4500 feet, it was decided not to attempt to recover any more of the casing. The total cost was $1.24 per foot compared to an original casing cost of $1.30 per foot.

At Fitzhugh 4 in the same area, 6515 feet of 7-inch casing was set inside of 1640 feet of 10¾-inch surface casing. The 7-inch casing was cut at 1630, 1930, 2230, 2530, 2830, 3130 and 3430 feet. The 1630-foot section was pulled, then 300 feet of 9-inch wash-over pipe with a 9⅝-inch rotary shoe on bottom was run and the 300-foot sections were recovered down to 3430 feet. Then another trip was made with the cutting tools, cuts were made at 4315, 4020 and 3725 feet, and these three sections recovered. Then cuts were made at 5115, 4915 and 4618 feet. The first section was recovered and on attempting to recover the second section cement was encountered at 4648 feet so no further recovery could be made. The total cost amounted to $1.34 per foot of casing recovered compared to an original cost of $1.32 per foot.

Based on the experience of these five wells, it is evident that this improved method recovered much more casing than could be obtained by shooting and pulling, this method made it economically feasible to recover much greater amounts of casing than could be recovered by ordinary cutting and wash-over operations, and still further refinements in the method were indicated which will reduce the cost per foot on future jobs.

TABLE 2
Cost of Recovering Casing

	Brundett 2, Chenango Field, Brazoria County, Texas	Huebner 2, Lucky Field Matagorda County, Texas	Davidson 1, Big Hill Area, Jefferson County, Texas	Gladys City 105, Spindletop Field, Jefferson County, Texas	Fitzhugh 4, Big Hill Area, Jefferson County, Texas
METHOD	Conventional	New	New	New	New
Interval Casing Cut, Feet	450	1000	500	200	300
Size Casing, Inches	5½	5½	7	7	7
Size Hole Drilled, Inches	9⅞	9⅞	9¾	9⅞	9⅞
Size of Washover Pipe, Inches	7⅝	7⅝	9	9	9
Days Rig Time	14.5	5.0	6.1	5.5	7.77
Rig Cost/Day	$550.00	$550.00	$564.00	$591.60	$486.00
Total Rig Time Cost	$8,002.00	$2,750.00	$3,443.09	$3,254.00	$3,787.00
Rental and Repairs on Tools	$2,353.00	$1,760.00	$2,148.62	$1,645.00	$2,388.00
Total Cost	$10,355.00	$4,510.00	$5,591.71	$4,899.00	$6,175.00
Feet Recovered	5,800	5,000	4,500	3,215	4,618
Cost/Foot of Recovered Casing	$1.78	$0.90	$1.24	$1.52	$1.34
Cost/Foot of New Casing	$0.84	$0.84	$1.30	$1.20	$1.32

As time is the chief element of expense in casing recovery jobs, Table 1 gives a comparison of time required to recover 5000 feet of 5½-inch casing in 1000-foot sections with the improved and the conventional methods.

Table 2 shows the length of sections cut, the amount of casing recovered, the cost of rig time, rental of tools and washover pipe, and the cost per foot compared to the original cost of the casing on the five wells from which casing was recovered.

Recommended Procedure

It is not possible to establish rigid rules due to the variable conditions at different wells but it is believed the following procedure will result in more effective and more economical casing recovery from wells which prove nonproductive.

1. Select as large an interval between cuts as is feasible, taking into account the quantity of wash pipe available and the clearance between the casing collars and the original walls of the hole. An interval up to 1000 feet for 5½-inch casing and up to 500 feet for 7-inch, is suggested.

2. Run a cutting tool and cut the casing a short distance above the theoretical top of the cement. Make additional cuts progressively upward at the predetermined interval.

3. Make up the string of wash pipe slightly longer than the interval between cuts, run an overshot between the top and the next to top joint.

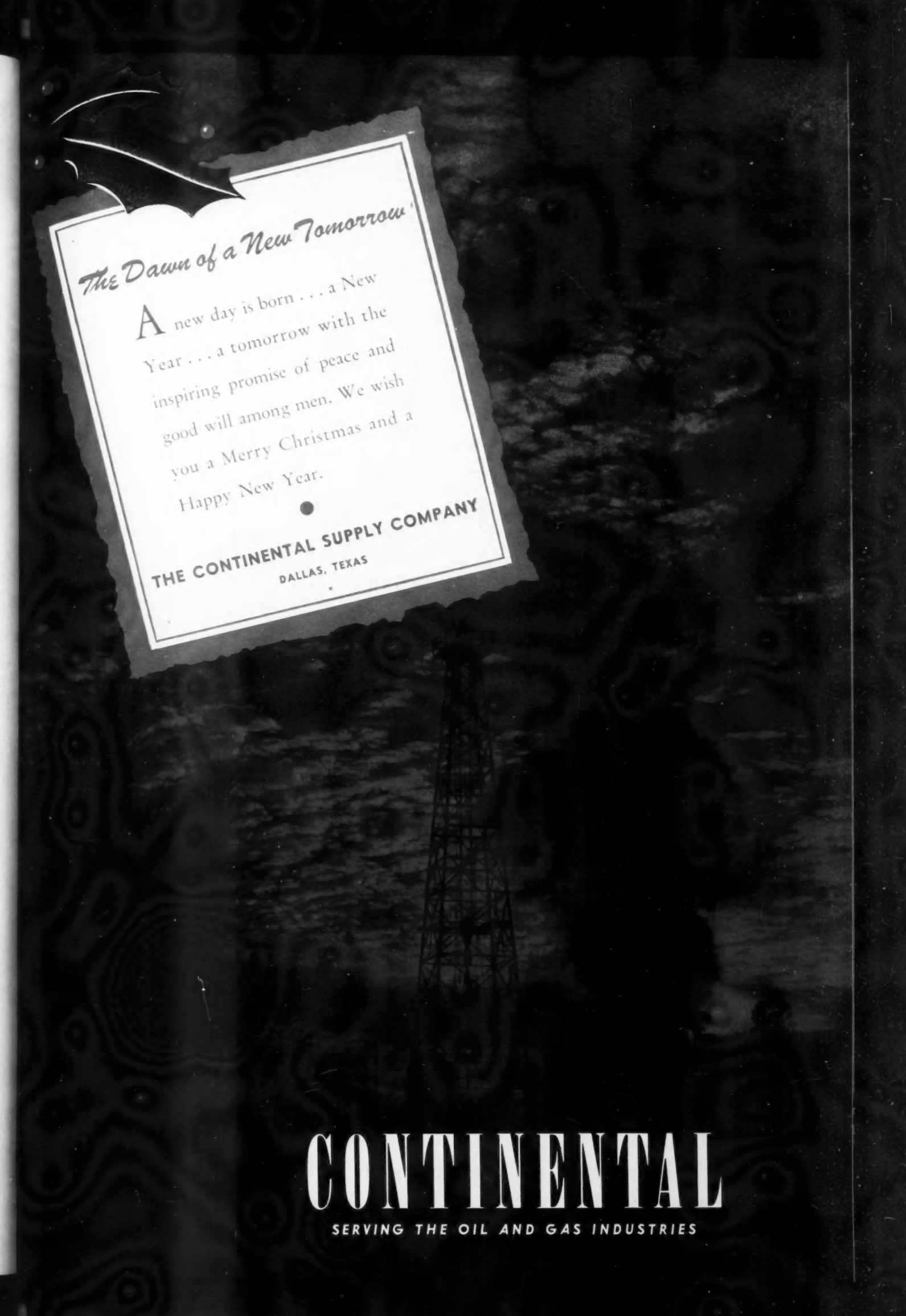
4. Wash over the casing until the overshot will latch over the top collar. Then pull pipe up until the overshot is above the rotary table, break the joint between the overshot and the balance of the wash pipe and set the wash pipe on slips.

5. Pull the casing through the washpipe, break it out and lay it down, then screw the top of the wash pipe back on the overshot and proceed to wash over the next section of casing.

Acknowledgment

This article has been prepared from information furnished by various members of the Culf Coast production division of Stanolind Oil & Gas Company. Special credit is due George McCray, superintendent in the Hastings area, under whose direction the new method has been developed and proven in the field. Grateful appreciation is given to these men, and also to the officials of the company for granting permission to publish the data.

Indicating the slight clearance between the casing and wash-over strings. When pulling casing, a spider was supported on the top of the wash string, and served to support the fish, tongs being used as back-up and break-out units to relieve spider of any but supporting load.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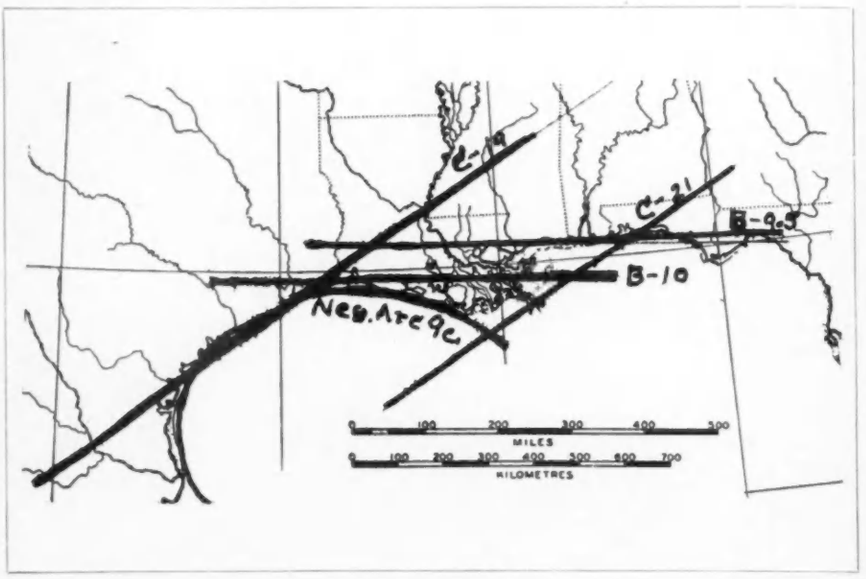
Are Salt Domes Genetically Related To Zones of Crustal Megashearing?

By ASHTON KEITH, Institute of Sciences

MAPPING of the principal zones of megashearing on this continent was completed 12 years after beginning our studies of the evidences of crustal movements. Primarily the trends were based on in-line evidences of vulcanism in its many forms, and on the voluminous data bearing upon co-axiality of very many recognized structures, with extrapolations across the numerous intervening masked areas. This was followed by several careful re-checks using data from other fields of study. While engaged in a check using facts on hypothermal and/or magmatic mineralization, it was observed that nearly all the more important salt domes of Louisiana are situated within or quite near the east-west zones of crustal mobility which the writer had listed as Meg. B-9.5 and Meg. B-10. These are tangent to the Gulf Coasts as shown on the attached map. In Texas the principal domes are near the great negative arcuate 9c which defines the coast line, and the rectilinear zone listed as Meg. C-19, which transects Louisiana from the northeast and is tangent to the Texas coastline near Corpus Christi. However, the full significance of that discovery was not at once appreciated. Somewhat later Dr. F. P. Shepard announced discovery of another series or row of submarine salt domes bordering a long, deep, nearly rectilinear trough which was found to extend southwestward beneath the waters of the Gulf from near the tip of the delta of the Mississippi River. That trough was found to be precisely in-line with another megastructure which long-previously had been shown on our maps as Meg. C-21. Not only is the existence of this great trend evidenced by co-axial continental structures to the northeast, but to the southwest it includes a deep co-axial trough beneath the waters of the Gulf. Noticeable minor alinements of salt domes long since had been observed and commented upon by many writers. As early as 1860, Thomassey called attention to this feature in Louisiana. Hagar in 1904, pointed out others and expressed the opinion that salt-dome structures originate from steam and hot gases which bring up the minerals from great depths. Kennedy, in 1917, made somewhat similar suggestions and showed the close association of most such domes with the coast line. Hopkins in the same year suggested the resemblance of these domes to igneous intrusions. Probably the most outstanding writer who has ascribed salt dome origin to magmatic waters rising from deeply penetrated crust, is DeGolyer who, in 1925 ably summarized the evidence for this mode of genesis. In this connection, numerous data of seismology are particularly interesting since they show that the great zones within which most of the salt-sulfur oil domes now are found to be situated, also have been centers of numerous seismic disturbances.



In the light of these evidences and of the early and oft-repeated suggestion that salt dome genesis is by the well-known process of hot, magmatic waters, rising from deep fractures in the crustal shell and depositing increasing amounts of sulfur and other minerals in the blanket rocks, the discovery reported by Dr. Shepard well may be considered as of great importance. For, far more safely now it may be assumed that the shaping of the Gulf has been attended not only by strong downward crustal bending, but also by deep, near-shore penetration of the crust. And not only does this assumption provide reasonable solutions for a number of puzzling salt-dome problems, but also the more promising areas for future drilling, within these trends more definitely delineated.

FRICK-REID

The Laws of Gas Flow in a Gas Reservoir

PART I

By EMORY N. KEMLER

Professor of Mechanical Engineering, Purdue University

USE of bottom-hole pressures for the practical study of operating methods for oil wells has become well established. Applications to gas wells has likewise been made but the methods have not been developed to the same extent. The more stringent requirements put on the gas industry as a result of the national emergency make it desirable to use every method available to determine the proper operating conditions and to collect necessary engineering information. The expanding operation of distillate fields which may behave as gas reservoirs has further extended the field of application of such data. This article, and a subsequent one, discusses the means of studying reservoir performance, introduces a new means of determining maximum reservoir pressure without requiring the well to be shut in for a long period, and gives a means of calculating the well capacity from buildup data. These methods have many advantages where the permeability is low and a long period is required for the well to reach uniform conditions.

The laws governing the flow of a compressible fluid such as a natural gas are somewhat different than for a liquid. In the case of a liquid, the volume of the fluid is essentially constant and is independent of the pressure over the range of conditions encountered. The flow of a natural gas follows the gas laws over a considerable range of conditions and within the limits of accuracy of other data can be considered as following them over the range of operating conditions to be studied. In the case of flow in reservoirs, the temperature of the reservoir and hence the gas will be constant and so called isothermal or constant temperature conditions can be assumed. For this condition the general relation for rate of flow as expressed in terms of the physical properties of the fluid, reservoir, and pressures will be

$$Q = \frac{2\pi k b}{P_o \mu \log_e \frac{r_d}{r_w}} (P_m^2 - p^2) = \frac{C}{P_o} (P_m^2 - p^2) \quad (1)$$

The corresponding formula of flow of

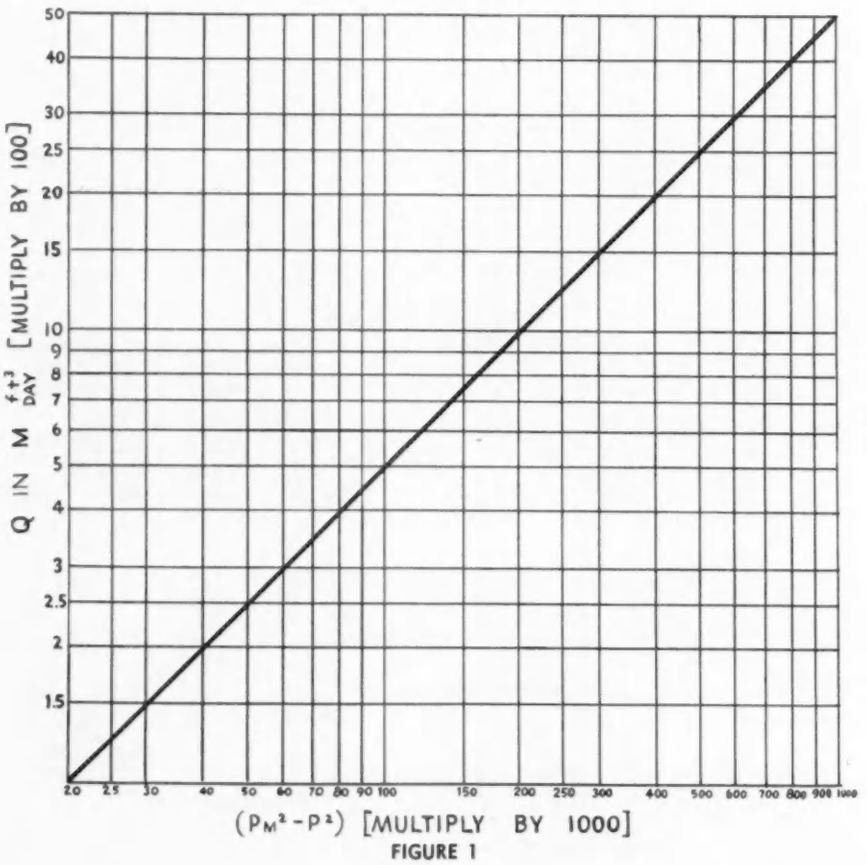


FIGURE 1

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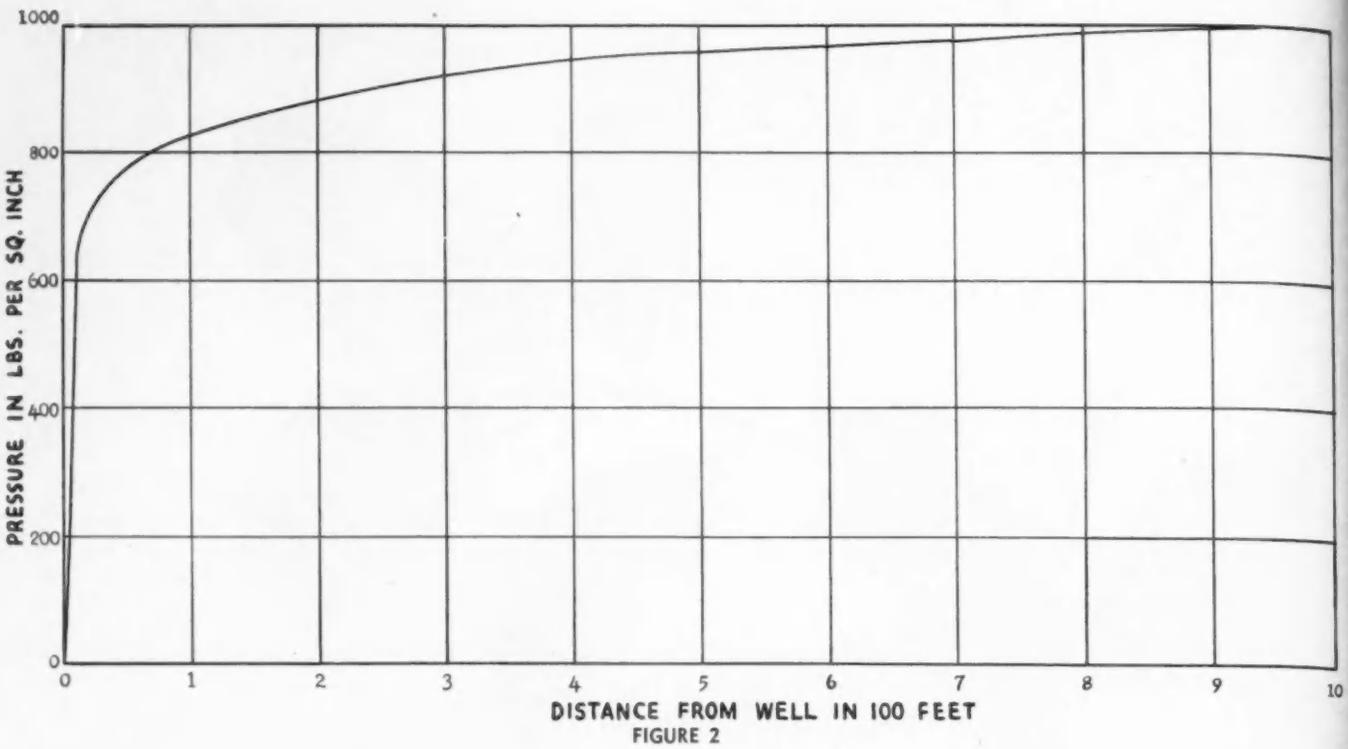


FIGURE 2

a liquid in a reservoir as given in a previous article[1] was

$$Q = \frac{2\pi k b}{\mu \log_e \frac{r_e}{r_w}}(P_m - P) = C(P_m - P).$$

where

k = permeability
b = sand thickness
g = 32.2
μ = viscosity
r_e = drainage radius
r_w = well radius
P_m = closed in reservoir pressure
P = pressure at well bore
Q = flow rate in cu. ft. per day at pressure P_e

Because of the nature of equation 1 as given above it is not convenient to plot Q against the quantity $(P_m^2 - P^2)$ on ordinary cross-section paper. This is because the pressures appear as the square and the range over which the flow is ordinarily desired is compressed into too small a range. If the log of each side be taken, the equivalent of a straight-line equation in terms of log coordinates will be obtained. If then a plot of Q vs. $(P_m^2 - P^2)$ be made on log-log paper a straight line will result. Such a curve has the advantage that the values can be read with equal accuracy at any part of the range. Figure 1 shows such a plot.

The maximum condition shown corresponds to a P_m value of 1000 pounds per square inch for the ideal case where $P = o$. If the well has a back pressure of 500 pounds per square inch put on it, the value of $(P_m^2 - P^2)$ will be reduced from 1×10^6 to $(1\times10^6 - 2.5\times10^5) = 7.5\times10^5$. The production would only be reduced from 5000 million cubic feet per day to 3700 million cubic feet per day. The reason for this small reduction can be seen after a consideration of the pressure distribution in the formation when producing.

The pressure at any point in the reservoir when producing at a rate which would give a pressure P_w at the well bore is given by the expression.[2]

$$p^2 = \frac{p_m^2 - P_w^2}{\log_e \frac{r_e}{r_w}} \log_e \frac{r}{r_w} + p_w^2$$

It is not obvious from this expression just how the pressure varies in the formation. This is best shown by an example. Figure 2 shows how the pressure varies for the case where the reservoir pressure P_m is 1000 pounds per square inch, the drainage radius $r_e = 1000$ feet and the well bore is ½ foot. This figure gives the pressure variation for the case where the pressure at the well bore p_w is zero. It shows very clearly that the most of the pressure drop occurs close to the well bore. Because of the increase in volume of the gas as the pressure decreases, the rate of drop near the well bore is much greater than in the case of flow of a liquid. A small increase in back pressure will greatly reduce the volume of flow near the well bore where the area is restricted. In the case shown in Figure 2 most of the pressure drop occurs within about a 10-foot radius.

The effect of back pressure can best be shown by use of a chart such as Figure 3. In this figure the back pressure as a percentage of reservoir pressure is plotted against the ratio of production to maximum production without any back pressure. This figure shows that the back pressure can be increased to .7 of the reservoir pressure and still give a production ½ the value without back pressure.

While back pressure within reason-

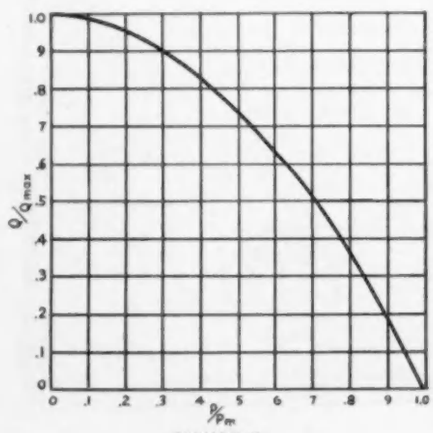


FIGURE 3

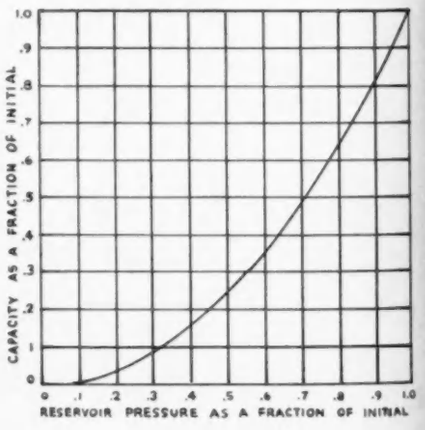


FIGURE 4

Merry Christmas and a Happy New Year

from

THE LARKINS

Jim Bill John

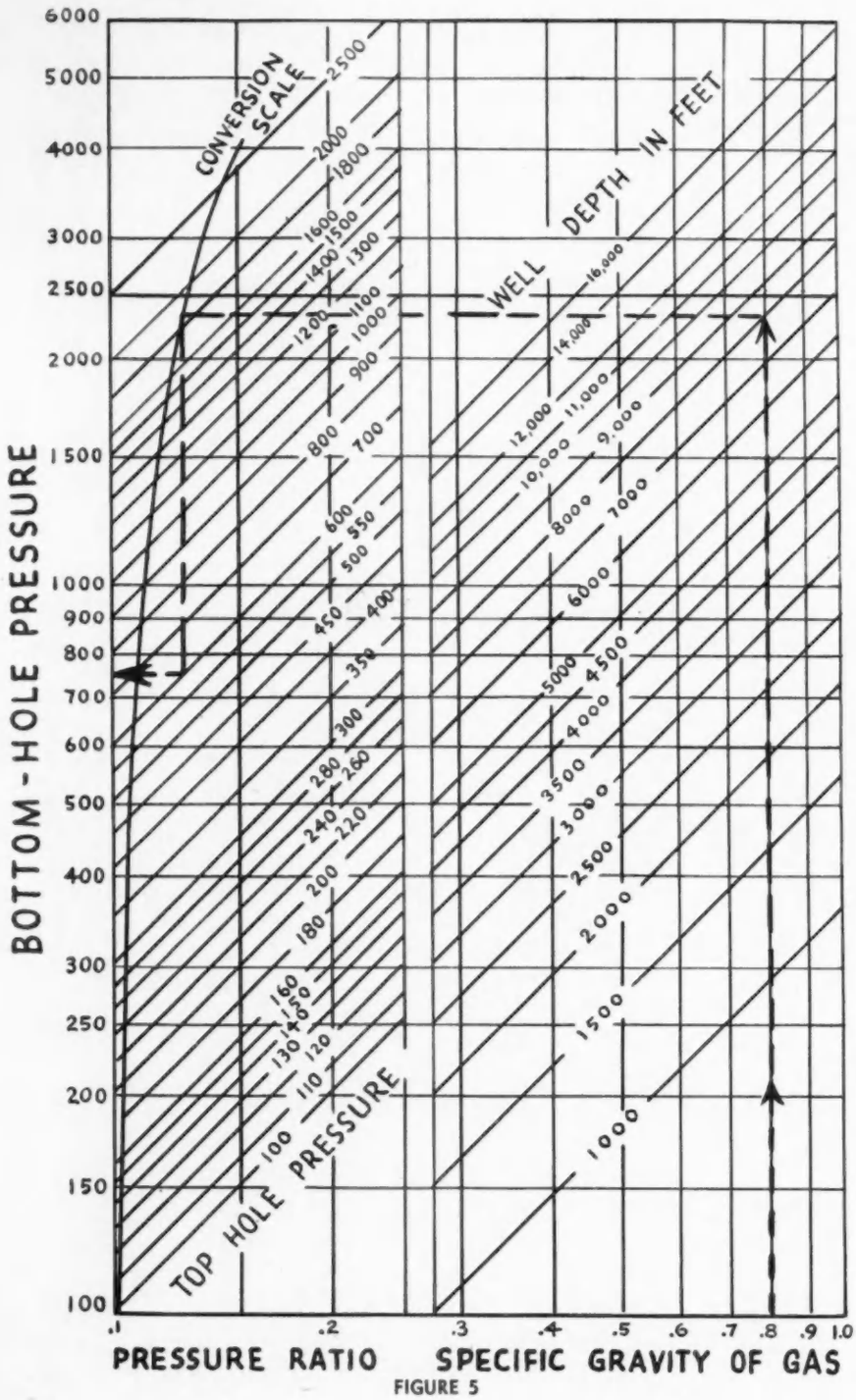
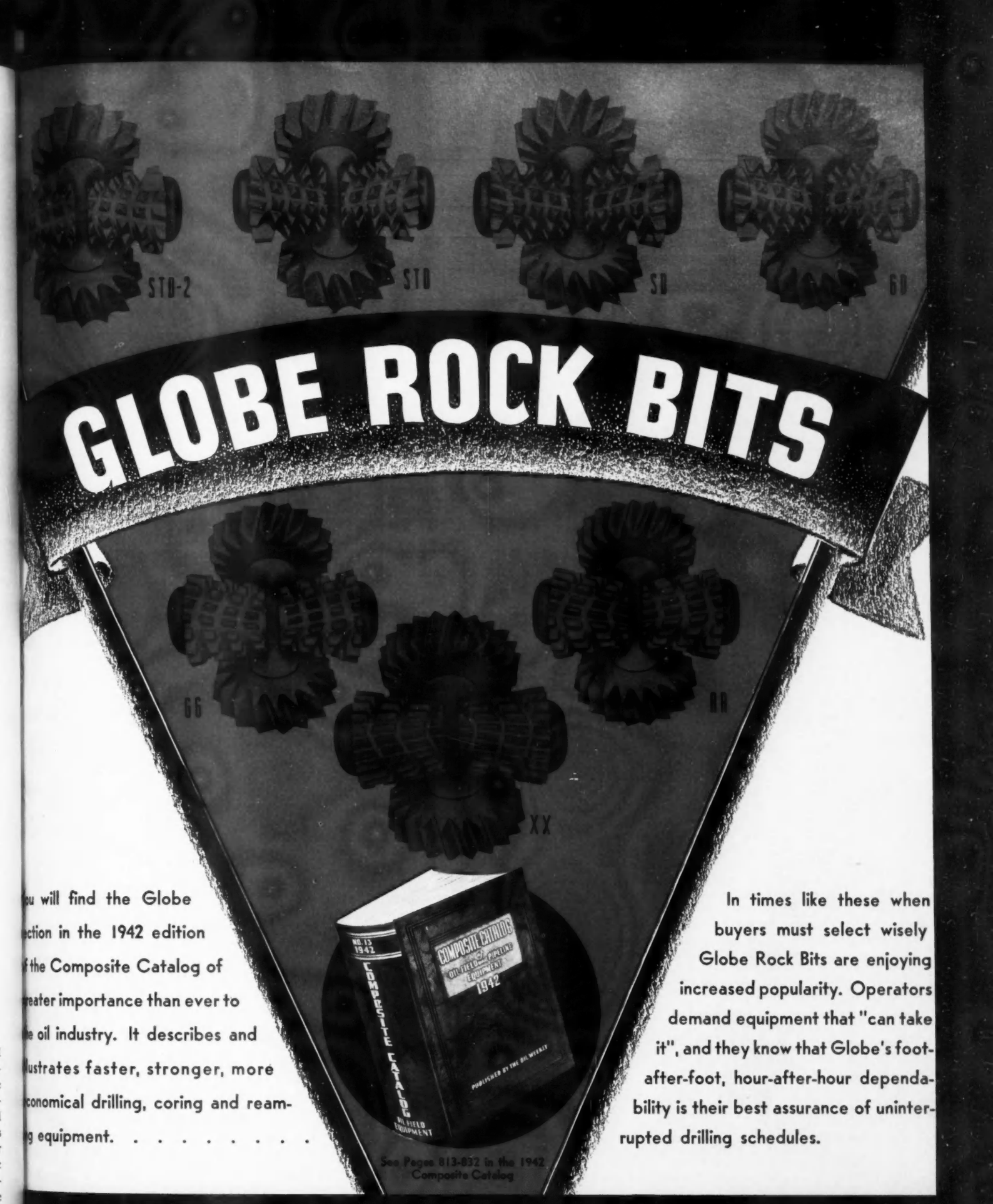


FIGURE 5

able limits does not produce much effect on well capacity, the reservoir pressure is a very important factor. Figure 4 shows a plot of production expressed as a percentage of initial production against reservoir pressure expressed as a percentage of the initial production. This curve shows that the capacity decreases quite rapidly as the reservoir pressure drops. This factor is of considerable importance in determining when remedial work is necessary and similar problems. This curve shows that when the bottom hole pressure drops to .7 of its initial value, the well capacity will only be .5 of its initial value.

The study of flowing gas wells requires a knowledge of the variation in pressure at the sand face. All formulas involved in a study of the reservoir are based on this pressure. It can be taken using a bottom-hole-pressure bomb placed opposite the formation. This pressure in the case of gas wells usually can be calculated from top-hole pressure. In the case the flow is through casing in a well not equipped with tubing, the problem is quite complicated and will not be considered here. In this case it is necessary to calculate the pressure drop in the flow string and to correct for density of the gas column. A very complete treatment can be found in the literature on this complicated problem.[3] The more general and simpler case is where the flow is through the tubing with the annular space around the tubing being in static condition. When this condition is encountered it is possible to calculate the bottom-hole pressure from top-hole pressure.

Figure 5 gives a chart which makes it possible to calculate the pressure at the bottom of a static column when the



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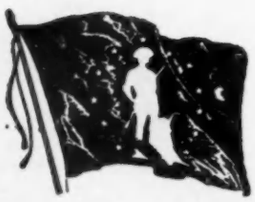

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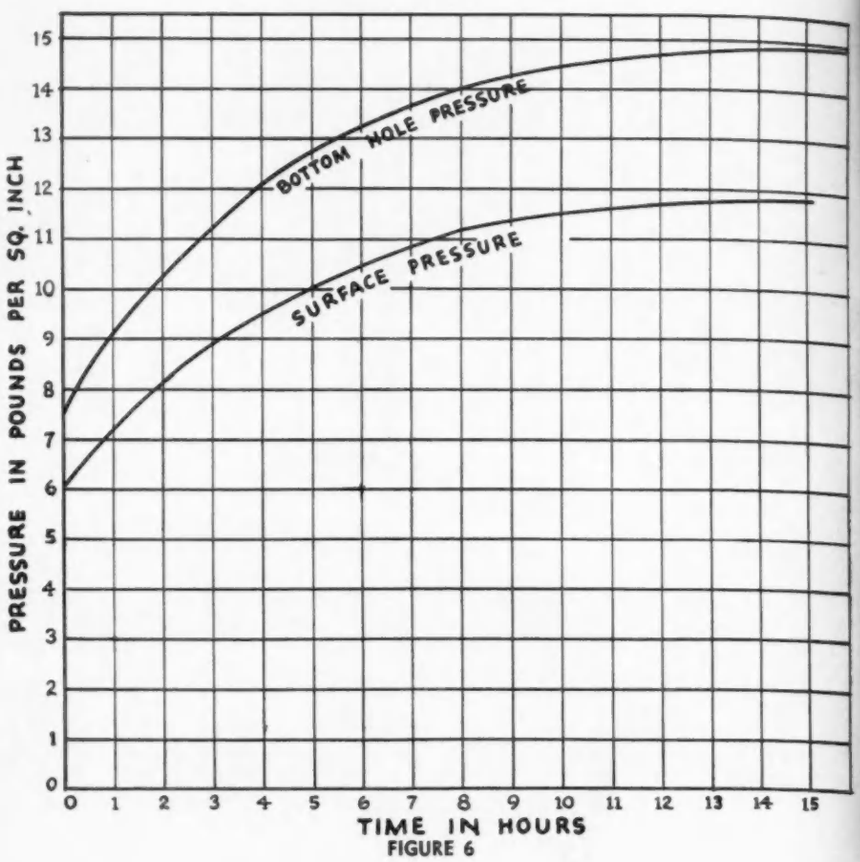

FIGURE 6

top-hole pressure and the specific gravity of the gas is known. The method of doing this is best illustrated by following the example shown in Figure 5. Enter the chart on the lower right hand corner at the scale marked specific gravity of the gas. Trace up to well depth in feet, then trace to the left to the conversion scale. Trace down or up as the case may be to the surface pressure in pounds per square inch and then to the left to the scale marked bottom-hole pressure. In the example shown the specific gravity of the gas is 0.80, the well depth 8000 feet and the top-hole pressure 600 pounds per square inch. This example shows that the corresponding bottom-hole pressure would be 750 pounds per square inch. It will be noted that a top-hole pressure of 60 pounds per square inch would give a bottom-hole pressure of 75 pounds per square inch. For higher or lower pressures any surface pressure scale can be used provided the corresponding bottom hole pressure is multiplied or divided by the same factor as the surface pressure. It will be noted that the lower left scale reads pressure ratio and gives the factor by which the surface pressure is to be multiplied to give the bottom-hole pressure.

The next article will deal with the determination of reservoir pressure and well capacity from build-up-pressure data. Since it is convenient to measure top-hole instead of bottom-hole pressure, it is necessary to convert the top-hole pressures in order to permit correct use of the methods to be outlined in the next article. Figure 6 shows a plot of build-up top-hole pressure data against time for an 8000-foot well for a gas of .8 specific gravity. A second curve on this chart shows the calculated bottom-hole pressure at corresponding times. These calculations are easiest made as outlined in Table 1. The top-hole pressure values are listed at the times for which they were outlined. The correction factor or bottom-hole pressure as desired can then be calculated as listed.

TABLE 1

Surface Pressure	Time	Correction for Gas Column	Bottom Hole Pressure
600	0	150	750
720	1	185	905
815	2	210	1025
890	3	230	1120
1000	5	270	1270
1110	8	290	1400
1140	10	300	1440
1165	12½	305	1470
1175	15	310	1485

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[1] Applying Bottom-Hole Pressure Data to Production Problems—Part I, by Emory Kemler, The Oil Weekly, Aug. 31, 1942, p. 22.26.
[2] Flow of Gas Through Porous Material, Physics, Vol. 1, No. 1, July 1931, p. 27-47.
[3] The Flow of Fluids in Pipes, by Emory Kemler, A.S.M.E. Trans. Vol. 55, No. 10, 1933, p. 7-32.

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A Review of Multiple-Zone Well Completions

By I. W. ALCORN, The Pure Oil Company, Houston, Texas
and
W. A. ALEXANDER, Shell Oil Company, Houston, Texas

THIS paper presents representative data on multiple-zone completions which have been made in the several oil-producing regions of the United States. It is a joint effort of the Topical Committees on Drilling and Production Practice, and constitutes a progress report on the subject.

The desire of the oil industry to find ways and means of conserving steel in its drilling and production activities led to the decision to undertake this survey. An analysis of 89 multiple-zone completions indicates that an average per-well saving of 105 tons, or 46 percent, was realized in a multiple-zone completion, in comparison with 2 standard well completions.

Available information indicates that the initial completion of well in more than one zone can be accomplished successfully. Reliable data on the effectiveness of the method are at present limited to the earlier stages of multiple-zone production. Sufficient representative data on the later life (especially during the artificial-lift period) of multiple-zone wells are not yet available to permit drawing any definite conclusions as to the ultimate overall practicability of the method.

Existing conditions with respect to critical materials reasonably may be expected to result in an accelerated development of improved technique and more advanced methods of application.

This paper presented to the Division of Production, before the Twenty-third Annual Meeting of the American Petroleum Institute, Chicago, November 10, 1942.

AT THE spring meeting of the Southwestern District of the Institute's Division of Production, in Dallas, Texas, in February, 1942, a number of suggestions were advanced as to ways and means of producing more oil with less use of critical materials, it having been agreed unanimously that for the duration of the war all projects undertaken by the committees of the Southwestern District should be in direct support of the war effort.

Prominent among these suggestions was a study of dual or multiple-zone completions; however, no decision was reached at that time as to the advisability of a paper on this subject. In the five months' period following the meeting a growing interest has been manifested in the subject due to the increasing scarcity of steel. In view of the wide interest exhibited, such a survey appeared to be warranted, inasmuch as the experience and data accumulated by operators having made multiple-zone completions were not available generally to the industry.

Subsequently it was decided that the Topical Committees on Drilling and Production Practice jointly would undertake a statistical survey of data on multiple-zone completion practices as a contribution to the petroleum industry. The two committees prepared a questionanire which was forwarded to all operators who have made multiple-zone completions. The executed questionnaires which were returned to the committees supplied the basic data used in this paper, which is to be considered as a progress report.

It was not the purpose of this survey to investigate the merits of multiple-zone completions or to offer recommendations as to general applicability of the method. Instead, the objective of the study was to present basic data made available to the committees mainly from the viewpoint of methods, equipment employed, the initial degree of success achieved, and difficulties experienced. It may well be that the desire or necessity to expend the minimum amount of critical material will lead to wider adoption of multiple-zone completions where the method can be employed successfully. Therefore, it is hoped that the data presented herein may be of some assistance as a guide to operators electing to make multiple-zone completions who have not had previous experience with the method.

Objectives of a Multiple-Zone Completion

A multiple-zone completion is considered herein as a means whereby two or more separate oil- or gas-bearing formations are exploited simultaneously in the same well. Under normal conditions the reasons prompting completion of a well in more than one zone usually would be either:

1. Economic: Initial investment required is substantially less for a multiple-zone completion than the expenditure necessary for drilling separate wells to the individual zones.

2. Regulatory: Spacing, or other restrictions imposed by regulatory bodies governing the number of wells permitted in defined surface areas.

However, under conditions existing at present, an important new reason for giving consideration to multiple-zone completions is the necessity for conserving steel.

Presentation of Data

Executed questionnaires were received covering multiple-zone completion of 89 wells in several of the different oil-producing districts of the United States. Obviously, all wells in which multiple-zone completions have been made in these areas were not reported on, but it does apepar that a reasonable cross-section was obtained, so that the data supplied should be representative and reliable.

Multiple-zone completions in California and Illinois are not included in the 89 wells previously referred to. Cory's*

* Robert F. Cory, "A Review of Multiple-Zone Production in California," *Proc. API* 22 **[IV]** 14 *(Production Bull. No. 223)* (1941).

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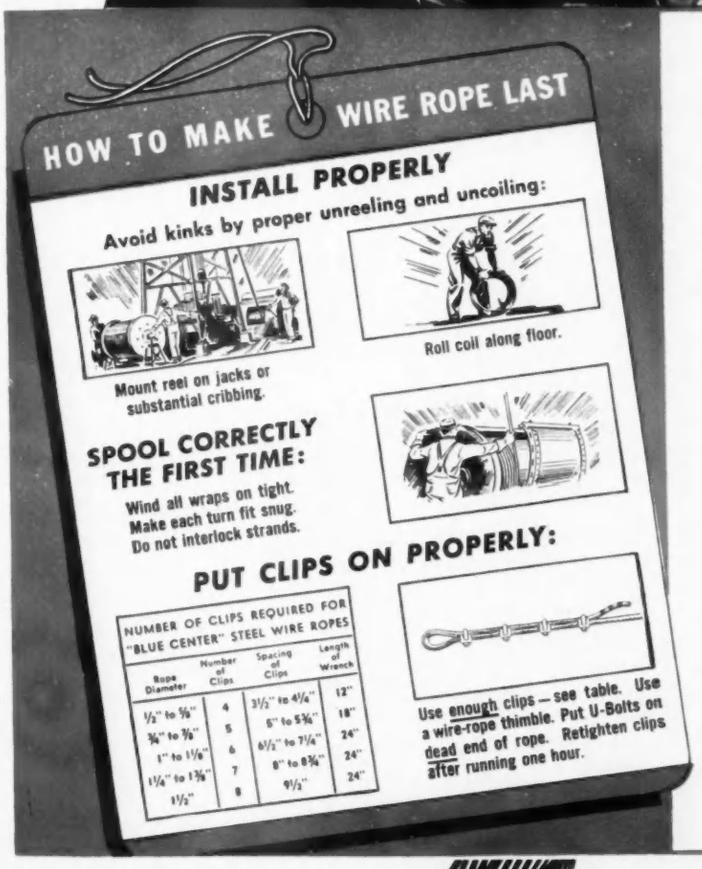
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Make each turn fit snug.
Do not interlock strands.
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¾" to ⅞" | 5 | 5" to 5⅜" | 18"
1" to 1⅛" | 6 | 6½" to 7¼" | 24"
1¼" to 1⅜" | 7 | 8" to 8¾" | 24"
1½" | 8 | 9½" | 24"
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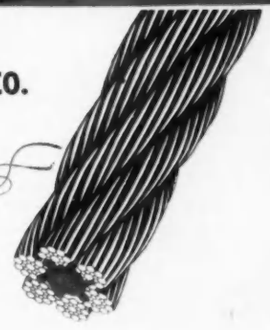

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PREFORMED OR NON-PREFORMED

recent paper (given at the annual meeting of the Institute in November, 1941) appears adequately to have covered California practice; moreover, a relatively small number of questionnaires was received from California.

In Illinois the very large number of multiple-zone completions, together with the wide range in procedure, indicated that questionnaire compilation of data would not be feasible. Instead, Messrs. R. J. Sullivan, of The Carter Oil Company, and Marshall Joy, of Cities Service Oil Company, prepared a summary of Illinois practice which will be included before final printing.

The data contained in the questionnaires were studied, and Table 1, "Tabulation of Data on Multiple-Zone Completions," was prepared as the most effective means of presenting the information obtained. The tabulation is a compilation of all data submitted on multiple-zone completions in the Gulf Coast, East Texas, West Texas, Oklahoma-Kansas, and Arkansas-North Louisiana areas.

Table 2 was prepared in order to highlight the more important features of Table 1.

From Table 2 it will be observed that of the 89 dual completions, 63 set casing through both zones and 26 set casing between zones. Sixty-nine of the wells used unloading valves of the Lewis and Otis variety. Only 5 were equipped with screen, and these opposite the lower zone. Two zones are being gas-lifted, and 7 pumped. Packers have been classified as removable and non-removable, of which we have 65 and 24, respectively. It is interesting to note that 50 wells were completed with 7-inch, 24 wells with 5½-inch, 12 wells with 6-inch, 2 wells with 6⅝-inch, and 1 well with 8⅝-inch casing. The smaller casing sizes appeared to offer no obstacle to dual completions.

As previously stated, Cory's paper is considered to be adequate for a review of California multiple-zone practice, and is more comprehensive than any analysis that might be offered herein. In summary, Cory states that the trend in California is away from multiple-zone completions, and the present feeling is that it should be used only in special cases justified by local expediency. This conclusion would appear to be based on difficulties experienced in producing multiple-zone wells during both flowing and artificial-lift periods. The questionnaires received from California appear to substantiate Cory's conclusions quite well. It is indicated that most of the multiple-zone wells now are producing from one zone only, even though the original completion was in two or three zones. The opinion is expressed by California operators that multiple-zone completions there might result in reduced ultimate recoveries per zone as compared to single-zone completions.

It is recognized that operating conditions as related to multiple-zone completions differ greatly between California and the Mid-Continent areas. Inability to put the two areas on a comparable basis is indicated by: 1, differences in rules issued by state regulatory bodies governing completion practices; 2, wide variance in proration plans, especially with regard to potential ratings; and, 3, non-uniformity in production reservoir characteristics such as nature and thickness of producing zone sections, viscosities of oils, etc.

The principal reason for multiple-zone completions as reflected in the Mid-Continent questionnaires was economy. The economies effected have been in the nature of reduced drilling costs, savings in casing and tubing, drilling equipment, lease roads, flow lines, dredging canals, derricks, pumping units, etc. In most instances the standard casing program was found to be about the same as that selected for the dual completion.

From the questionnaires it was observed that, in many of the wells, squeeze cementing was resorted to before attempting to complete in more than one zone. There were 17 cases reported of squeeze cementing between zones, 5 above the top zone, and 8 opposite or below the lower zone. It is obvious that the purpose of the 17 squeeze jobs between zones was to insure a complete shutoff between them, whereas the other 13 squeeze jobs may have been performed to shut off gas or water. Some difficulties have been experienced with sand-cutting the tubing opposite the upper zone. Most of the operators now are attempting to overcome this trouble by covering the portion of the tubing opposite the upper zone with a rubber or neoprene sleeve, although some have installed as a substitute a pipe sleeve over the tubing.

Generally, no serious difficulties were experienced in making the initial multiple-zone completions. Most of the troubles reported were with packer settings, and these apparently were of a temporary nature, with final successful results. No evidence was submitted which would indicate commingling of zones due to leakage around the packer after it had been set.

The more commonly reported difficulties in completing and producing multiple-zone wells are as follows:

1. Sand-cutting the tubing opposite the upper zone, resulting in commingling.
2. Difficulty in setting packers.
3. Some instances of stuck packers.
4. Cases of trouble in pulling or seating bottom-hole choke; also in swabbing the well in, both due to sand plugging the side-door choke.
5. Few cases of producing both zones through the tubing in order to prevent paraffin deposition in annulus.

Attention is directed to the fact that, of the 89 multiple-zone wells studied, only 9 zones in total were being produced by artificial lift, 2 by gas lift, and 7 by pumping.

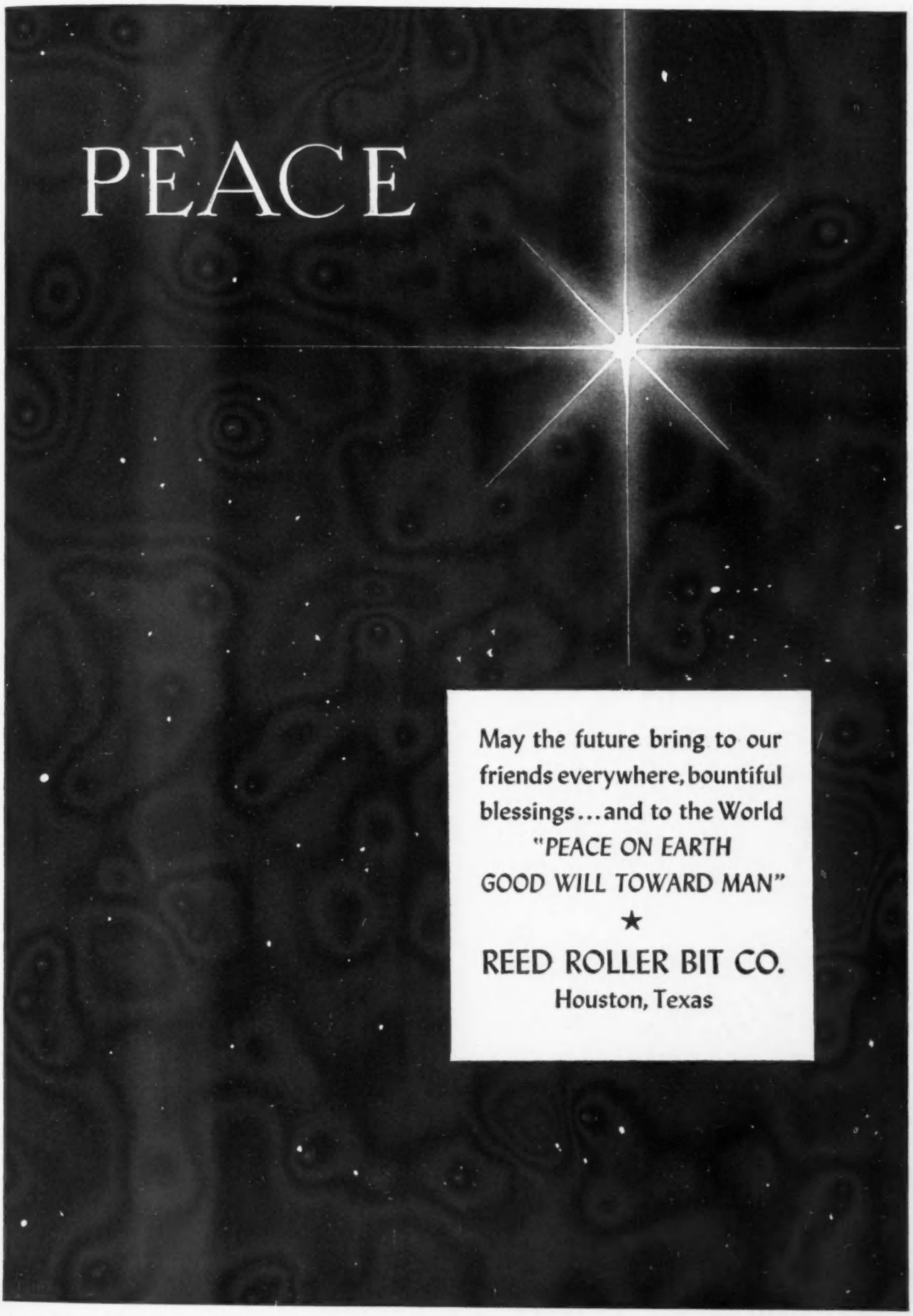
The seven zones being pumped are in wells in the Oklahoma-Kansas area. Present practice is intermittent production of each zone separately, by pumping through the tubing. During the first 15 days, the month's allowable may be pumped from the lower zone, after which the tubing is raised enough to bring the perforations in the tubing above the packer; then the allowable for the upper zone is pumped the latter half of the month. Up to date this practice has been entirely satisfactory.

The questionnaires contained a request for the operators' plans regarding artificial lift. Thus far most of the operators do not seem to have planned a program as to the manner in which artificial lift will be applied to the individual zones when this stage of production becomes necessary. A few seem to feel that pressures in the two zones will be equalized sufficiently by the time artificial lift is necessary to permit the zones to be produced together as one operation. Others offer the opinion that the zones may have to be produced artificially one at a time and separately, say the lower first and the upper one later. Still others comment that both zones will be separately and simultaneously lifted artificially; for example, by gas-lifting the upper zone by means of a macaroni string in the annulus, and by pumping the lower zone through the tubing.

Methods and Equipment

On account of wide common usage, the term "multiple-zone completion" has been used throughout this paper. Actually, however, all 89 of the wells included in the study were completed in only 2 zones; hence, they might more properly be termed "dual completions."

The increasing use of the multiple-zone completion method has resulted in the development of different techniques and the availability of various kinds of equipment. In the normal course of a multiple-zone completion there are but two major items of equipment which usually would not be used in a single-zone well. These two pieces of equipment, of course, are the packer set between the two producing zones,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May the future bring to our friends everywhere, bountiful blessings... and to the World
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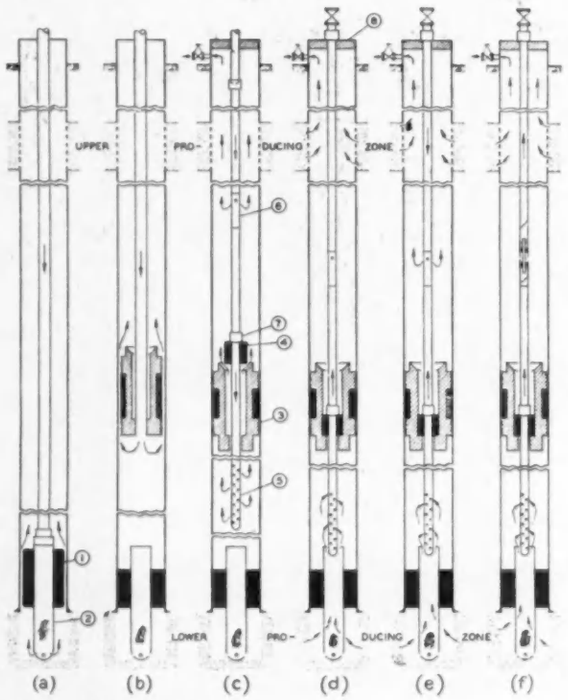
and the unloading valve. A description briefly outlining several typical dual-completion methods, with emphasis on the purpose and type of special equipment such as packers and unloading valves, is given hereinafter.

It will be appreciated that the methods and equipment described are not to be construed as recommendations of the authors, but simply as a means of illustrating some of the various methods followed and equipment utilized. It is hardly necessary to point out that conditions existing in an individual well, together with the particular purpose of the dual completion to be made and the operator's judgment, will be the determining influence on choice of method and equipment.

Typical Dual Completion Using Permanent (Non-Removable) Packer

General

The method shown in Figure 1, is the simplest type of dual completion. The lower zone may be screened as shown in Figure 2, if desired. A side-door choke or similar upper inlet (unloading) valve also may be used in conjunction with this method. It is assumed that both zones have been suitably perforated and treated, tested, or otherwise prepared for completion.



1. Screen Collapsible Packer
2. Screen
3. Non-Removable Type Packer
4. Tubing Packer
5. Tail Pipe
6. Side Door Choke
7. Safety Joint—Left Hd. Thd.
8. Xmas Tree

FIGURE 1

Typical Dual-Well Completion Method—Using Nonremovable Type of Packer.

Operation No. 1: Figure 1 (a)

This operation consists of running and setting the permanent-type packer at the desired position in the well.

Operation No. 2: Figure 1 (b)

The tubing with the tail pipe, which is finally to seal off in the packer body, is run into the well until the anchor pipe is through the packer at about its final position. The tubing then is raised sufficiently to place the tail-pipe perforations above the packer. The upper zone then is washed or swabbed into production.

Operation No. 3: Figure 1 (c)

The tubing now is lowered sufficiently to place the perforations below the packer, and tubing hung on the tubing head. The lower zone then is swabbed into production.

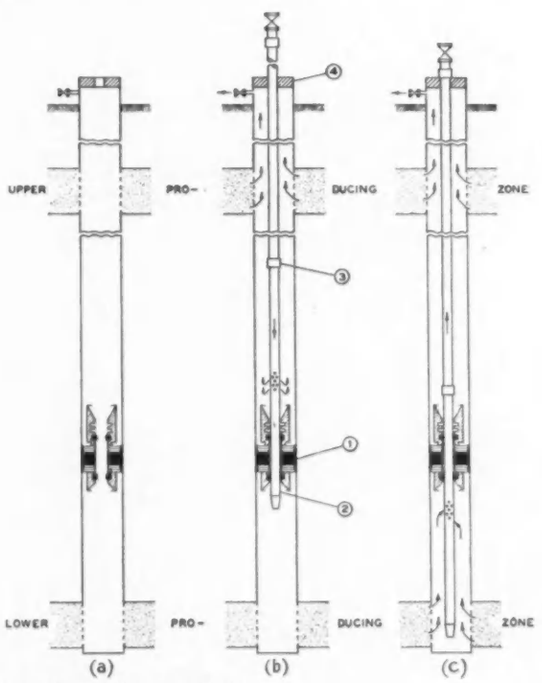
Typical Dual-Completion Method Using Permanent (Non-Removable) Type Packer

General

Figure 2 shows another kind of typical dual completion, illustrating the use of a permanent (non-removable) type packer with a screen setting in the lower zone. A side-door choke is shown as one type of unloading valve. The operation is unchanged in cases in which the screen is not used [Figure 2 (a)], and the lower screen and packer [Figure 2(b) to (f)] merely being eliminated. Various makes of packers and other accessories are available for this type of completion. It is assumed that both zones have been suitably perforated and treated, tested, or otherwise prepared for completion.

Operation No. 1: Figure 2 (a)

The screen and liner are run into the hole on drill pipe or tubing, a partial washing job made by spotting a safe amount of water, the screen and liner released, the liner packer collapsed, and the drill pipe removed.



1. Non-Removable Type Packer
Tail Pipe
Safety Joint
Xmas Tree

FIGURE 2

Typical Dual-Well Completion Method—Using Nonremovable Type of Packer.

Operation No. 2: Figure 2 (b)

The permanent interzone packer then is run in on tubing or drill pipe, the mud above the packer is conditioned, and the packer is set in the desired position. The tubing or drill pipe and setting tool then are removed.

Operation No. 3: Figure 2 (c)

Tubing then is run back into the hole with the tail pipe, inner packoff, safety joint, and side-door choke, or equivalent material, assembled as shown in Figure 2(c). The tubing seat is located, and the tubing-hanger nipple inserted at the correct spacing for hanging. The tubing packer then is lowered to a point close to its final setting point, and wash-

WAR AT CHRISTMAS

does not mean that peace and good will are dead.

Rather it means that peace and good will are more alive than ever, for is not our nation and its allies fighting to the death against an ideology that would make a mockery out of all Christian virtues that stem from the dignity of the individual and the brotherhood of man.

At this critical time when Christmas takes on a deeper meaning than ever, we of the Mission Manufacturing Company extend our greetings to Oil Men everywhere — in the armed forces, and in the production lines in which the oil industry plays such a vital part.

Mission Manufacturing Co.

Houston, Texas

TABLE 1
Tabulation of Data on Multiple-Zone Completions

FIELD	Number of Wells	Date Completed	Reason for Multiple-Zone Completion	Average Depth (Feet)	Interval Between Zones (1) and (2) (Feet)	Type of Formation of Zones (1)	Type of Formation of Zones (2)	Casing Size (Oil String) (Inches)	Point at which Casing was Set	Tubing Size (Inches)	Screen	Type of Packer Used	Type of Unloading Valve	Daily Rates of Production Zones (1)	Daily Rates of Production Zones (2)	Producing	Production Method Zones (1)	Production Method Zones (2)	Savings—Dual Well Compared to Two Single Wells: Steel Percent	Savings—Dual Well Compared to Two Single Wells: Steel Tons	Savings—Dual Well Compared to Two Single Wells: Cost (Percent)
Gulf Coast Area—Texas:																					
La Gloria	10*	Early 1941	Planned cycling program	6,500	600	Sand	Sand	7	Through both zones	4½ and 1¼	None	Removable	Lewis	10,000 MCF	6,500 MCF	Simultaneously	Natural flow	Natural flow	42	132	32
Stratton	17	Early 1941	Planned cycling program	6,500	20	Sand	Sand	7	Through both zones	4½ and 1¼	None	Removable	Lewis	5,000 MCF	5,000 MCF	Simultaneously	Natural flow	Natural flow	42	132	32
Katy	3	7/42	Scarcity of material	7,400	100	Sand	Sand	7	Between zones	2½	Lower zone	2 non-removable 1 removable	Otis	20,000 MCF	10,000 MCF	Simultaneously	Natural flow	Natural flow	30	62	25
La Rosa	1	4/41	Obtain fuel gas	5,800	200	Sand	Sand	7	Through both zones	2½ and 1¼	None	Non-removable	Use 1¼-in. tubing	3,000 MCF	3,000 MCF	Simultaneously	Natural flow	Natural flow	24	28	40
Dickinson	1	1/42	Obtain additional source gas	8,000	50	Sand	Sand	7	Through both zones	2½	None	Non-removable	Otis	2,500 MCF	1,500 MCF	Simultaneously	Natural flow	Natural flow	49	193	38
Naubro	1	10/41	Economy	5,200	60	Sand	Sand	7	Through both zones	2½	None	Non-removable	None	1,500 MCF	70 bbl. oil	Simultaneously	Natural flow	Natural flow	41	67	35
West Ranch	1	4/40	Economy	5,700	700	Sand	Sand	7	Through both zones	2½	None	Non-removable	Brown equalizing valve	700 MCF	50 bbl. oil	Simultaneously	Natural flow	Natural flow	30	49	40
Jackson County	2	1940–1941	Obtain fuel gas	5,200 5,900	50	Sand	Sand	5½	Between zones	2	Lower zone	Removable	None	800 MCF	40 bbl. oil	Simultaneously	Natural flow	Natural flow	50	71	45
Anahuac	1	9/35	Obtain fuel gas	7,000	300	Sand	Sand	7	Between zones	2½	Lower zone	Removable	None	.....	35 bbl. oil	Lower only	Natural flow	Natural flow	50	135	44
Port Neches	1	6/41	Gas for lease operations	3,500	1,400	Sand	Sand	5½	Through both zones	2	None	Removable	Otis	700 MCF	100 bbl. oil	Simultaneously	Natural flow	Natural flow	50	62	45
Odem	1	11/41	Economy	5,300	1,800	Sand	Sand	5½	Through both zones	2	None	Removable	Otis	.....	.....	Intermittently	Natural flow	Natural flow	...	.....	...
Louisiana:																					
Cheneyville	1†	8/38	Economy	6,000	75	Sand	Sand	8⅝	Through both zones	2½	None	Removable	Otis	100 bbl. oil	100 bbl. oil	Together	Gas lift	Gas lift	...	.....	...
Hackberry	1	6/42	Scarcity of material	9,200	200	Sand	Sand	7 and 5 liner	Through both zones	2½ and 2	None	Removable	Otis	75 bbl. oil	75 bbl. oil	Simultaneously	Natural flow	Natural flow	49	143	45
White Lake	1	4/42	Economy	6,500	450	Sand	Sand	5½	Through both zones	2	Lower zone	Non-removable	Otis	176 bbl. oil	187 bbl. oil	Simultaneously	Natural flow	Natural flow	48	93	45
Ville Platte	10‡	Early 1941	Offset obligations	8,900	150	Sand	Sand	6	Through both zones	2 and 2¼	None	Non-removable	Otis	40 bbl. oil	120 bbl. oil	Simultaneously	Natural flow	Natural flow	50	120	45
Ville Platte	2	6/42	Economy	10,000	1,150	Sand	Sand	6	Through both zones	2 and 2½	None	Non-removable	Otis	80 bbl. oil	100 bbl. oil	Simultaneously	Natural flow	Natural flow	46	142	45
Anse La Butte	1	2/42	Economy	6,000	100	Sand	Sand	5½	Through both zones	2	None	Non-removable	Otis	150 bbl. oil	165 bbl. oil	Simultaneously	Natural flow	Natural flow	50	78	47
East Texas Area—																					
Carthage	1	8/42	Economy	5,900	1,000	Sand	Sand	5½	Through both zones	2	None	Non-removable	Otis	2,400 MCF	1,000 MCF	Alternately	Natural flow	Natural flow	46	155	45
Chapel Hill	1§	Early 1942	Economy	8,000	2,300	Sand	Lime	5½	Through both zones	2	None	Non-removable	Otis	Shut in	74 bbl. oil	Lower only	Shut in	Natural flow	44	87	11
Chapel Hill	1	Early 1942	Economy	8,000	2,300	Sand	Lime	5½	Through both zones	2	None	Non-removable	Circulation joint	Shut in	74 bbl. oil	Lower only	Shut in	Natural flow	44	96	30
Chapel Hill	1	2/42	Economy	8,000	2,300	Sand	Lime	7	Through both zones	2½	None	Removable	None	5,000 MCF	74 bbl. oil	Simultaneously	Natural flow	Natural flow	15	29	40
Long Lake	4	1940	Economy and planned cycling program	5,300	20	Sand	Sand	7	Between zones	2½	None	Removable	None	6,000 MCF	45 bbl. oil	Simultaneously	Natural flow	Natural flow	50	133	...
Long Lake	7	1940	Economy and planned cycling program	5,300	40	Sand	Sand	5½	Between zones 5 and 2 through both	2	None	Removable	Otis	6,000 MCF	45 bbl. oil	Simultaneously	Natural flow	Natural flow	52	95	48
Long Lake	7	1940–1942	Economy and planned cycling program	5,300	20	Sand	Sand	5½ (5), 7 (2)	Through both zones	2	None	Removable	Otis	4,000 MCF	10 to 10,000 MCF	Simultaneously	Natural flow	Natural flow	52	95	48
Cayuga	3	1941	Economy and planned cycling program	4,000	150	Sand	Sand	6⅝ (2) 5½ (1)	Between zones	2	None	Removable	Otis	8,000 MCF	50 bbl. oil	Simultaneously	Natural flow	Natural flow	50	52	48
West Texas Area—																					
Kimble County	1	7/42	Economy	1,500	150	Sand	Sand	8⅝ and 5 liner	Through both zones	2½	None	Removable	None	Shut in	4 bbl. oil	Lower only	Shut in	Natural flow	41	25	37
Kermit and Estes	2	Early 1941	Gas for artificial lift	2,500	200	Sand	Sand	7	Between zones; set through lower zone not cemented	2½ and 1½	None	Removable	None	250 MCF	4 bbl. oil	Simultaneously	Natural flow	Gas lift	48	48	48
Kansas-Oklahoma Area—																					
Ramsey	1	8/41	Offset obligation	4,800	200	Lime	Sand	5½	Between zones	2½	None	Removable	None	24 bbl. oil	15 bbl. oil; 288 bbl. water	Simultaneously	Natural flow	Pumping	50	56	46
Gurney	1	5/41	Economy	3,150	175	Lime	Sand	7	Between zones	2½	None	Non-removable	None	32 bbl. oil	38 bbl. oil	Intermittently	Pumping	Pumping	50	60	46
Trapp	1	7/42	Increase in allowable	3,300	200	Lime	Lime	7	Between zones	3	None	Non-removable	None	155 bbl. oil	140 bbl. oil	Intermittently	Pumping	Pumping	47	39	42
Anschutz	1	4/41	Offset obligation	3,300	250	Lime	Lime	7	Between zones	2	None	Non-removable	None	3 days 36 bbl. oil	15 days 32 bbl. oil; 33 bbl. water	Intermittently	Pumping	Pumping	50	56	46
Arkansas-North Louisiana Area—																					
Rodessa	1	12/36	Obtain gas for fuel	6,000	150	Lime	Lime	7	Through both zones	2½	None	Removable	Otis	2,000 MCF	225 bbl. oil	Simultaneously	Natural flow	Natural flow	50	144	46
Schuler	1	5/42	Test feasibility of dual completion	6,800	120	Sand	Sand	7	Through both zones	2½	None	Non-removable	None	100 bbl. oil	2,000 MCF	Simultaneously	Natural flow	Natural flow	50	.....	50

* Three of these wells for injection purposes. Volumes as high as 20,000 MCF for each zone returned to formation.
† Well produced zones individually on natural flow, but combined when natural flow ceased and placed on gas lift.
‡ Much difficulty experienced in effecting dual completion. Eight attempts to set various packers had been made before successful seal was obtained.
§ Several of these wells at one time were or now are being used as gas-injection wells in a pressure-maintenance project. The lower zone in one of the wells is being produced by gas lift through a string of 1½-in. tubing at 4350 ft. inside of 2½-in. tubing.

TABLE 2
Miscellaneous Summary

Type of Completions: Upper Zone / Lower Zone	Number of Wells	Casing Through Both Zones —Size—(Inches)	Casing Between Zones —Size—(Inches)	Removable Packers	Non-removable Packers	Number of Unloading Valves	Number of Screens	Number of Gas-Lift Zones	Number of Pumping Zones
Gas and gas	40	31—7 6—5½	3—7	35	5	39	1	0	0
Gas and oil	28	4—7 6—5½	7—7 9—5½ 2—6⅝	24	4	14	3	1	0
Oil and gas	1	1—7	....	0	1	0	0	..	0
Oil and oil	17	1—8⅝ 9—6 2—5½	4—7 1—5½	3	14	13	1	1	7
Gas and oil (input)	3	3—6	....	3	0	3	0	0	0
Total	89	63	26	65	24	69	5	2	7

ing is started and continued until the well flows through the annulus.

Operation No. 4: Figure 2 (d)

Circulation is stopped, the tubing packer is set and locked, and the tubing hung.

Operation No. 5: Figure 2 (e)

If the well stops flowing through casing, oil or gas may be circulated through the side-door choke until the well is flowing again. Circulation is stopped, and the well flows or may be swabbed in through the tubing until strong flow is established.

Operation No. 6: Figure 2 (f)

When both tubing and casing are flowing sufficiently, the tubing is closed in, and a blank bean run into the side-door choke. This separates the tubing flow from that in the annular space. Swabbing might be necessary to reestablish flow in the tubing, and this may be carried out in the usual manner until the well may be put on production.

Typical Dual-Completion Method Using Lewis Valve

General

Figure 3 shows a typical dual-completion method which is representative of a number of successful installations, using a removable-type packer and an unloading valve. This latter device was developed for special application to gas-distillate wells for the purpose of removing condensate from the annulus. In wells in which this device has been used, the casing string has been 7-inch with a 4½-inch tubing string as the intermediate string and 1¼-inch tubing as the macaroni inner string. As in other illustrations, the well is assumed to be suitably prepared for completion.

Operation No. 1: Figure 3 (a)

The tail pipe, packer, unloading valve and 4-inch tubing are assembled and run into the hole. The packer is set at the desired point, and the 4½-inch tubing landed in the tubing head. The well may be washed in partly, prior to setting the packer.

TABLE 3
Summary Tabulation

AREA	Number of Multiple-Zone Completions	Average Per-Well Savings of Dual Completion Compared to Two Single Wells: Steel: Percent	Steel: Tons	Cost (Percent)
Gulf Coast	55	45	116	34*
East Texas	25	48	93	41†
West Texas	3	47	41	47
Kansas-Oklahoma	4	49	53	46
Arkansas-North Louisiana	2	50	157	48
		Weighted	average per-	well savings:
Total wells	89	46	105	37

* Based on 41 out of 55 wells. † Based on 19 wells out of 25. Dual completion of one of the 19 wells cost considerably more than the estimated cost of drilling 2 wells, on account of protracted fishing job resulting from difficulties with packer setting.

Operation No. 2: Figure 3 (b) and (c)

The macaroni string next is run, connected into the Lewis valve and hung in the tubing head. The actuating cylinder then is assembled ready for operation. The well next is washed in, down the 1¼-inch tubing; and, by means of operating the unloading valve, through either the upper-zone-producing annulus or the lower-zone-producing annulus, as shown in Figure 3(b) and (c).

Operation No. 3: Figure 3 (d) and (e)

After the two zones have been washed in, the well is placed on production through the two annular spaces. In the event of difficulty in inducing natural flow, the inner macaroni string may be used to assist by jetting gas down the string and into the desired annular space. The routine use of the macaroni string is for the purpose of continuously removing liquid which accumulates at the bottom of the well. The operation of the unloading valve is controlled automatically by means of a timing device at the surface, and power for raising and lowering the tubing at set intervals is obtained from one of the annular producing passages.

Summary

As stated in the introduction, one of the main objectives of the survey was to examine multiple-zone completions already made from the point of view of savings of critical materials by means of this method of completion. In Table 1, savings in steel and cost realized by individual multiple-zone wells were shown, and these figures are summarized in Table 3.

Table 3 illustrates by areas the average savings in steel and money on a comparable basis with 2 standard wells. It is indicated that the weighted-average saving for the 89 cases studied is 46 percent, or 105 tons of steel, and a reduction of 37 percent in initial drilling cost for a multiple-zone completion as compared to two single-zone wells.

The 89 wells listed in Table 1 include not only initial multiple-zone completions, but a number of original single-zone wells which later were converted to dual producers. Serious difficulties in such cases of conversion were not reported, and this application of the method offers possibilities if there are a number of producing zones cased off.

The various procedures followed and different kinds of equipment used were described in the questionnaires. However, no attempt has been made in this paper to describe all of the alternative methods or equipment employed. Instead, generalization was attempted in order to present an overall picture of the essentials involved, realizing that local conditions and operators' choice would dictate the final selection of both methods and equipment. Selection of type of packer, point of packer setting, type and placement of unloading valve, screen setting, casing point, etc., are flexible, and rest upon requirements of the individual well concerned and the judgment of the operator.

The questionnaires requested data on problems encountered in operating multiple-zone wells after completion had

been made, and the manner in which such difficulties were overcome. Cases of trouble due to sanding up as a result of sand-cutting the tubing opposite the upper perforations and paraffin difficulties were reported but, on the whole, no really major problems in producing multiple-zone wells were brought out. This may be explained partly by the fact that most of the completions are of fairly recent date, and are being produced at low allowable rates on natural flow. Perhaps during the later producing life of such wells, when water is being produced and other difficulties such as sand entering the hole become more common, the more unfavorable aspects of producing multiple-zone wells will appear.

It was hoped at the outset that it would be possible to present some reliable data on artificial-lift experience in multiple-zone wells. However, only in California and Kansas has any experience in artificial lift been accumulated. As discussed previously, California operators report considerable difficulty in artificially lifting their multiple-zone wells. On the other hand, under conditions prevailing in the Kansas wells on which data were obtained, artificial lift appears to constitute no operating difficulty. The contrasting experience in these two areas would seem to indicate that local conditions may be the governing factor in artificially lifting multiple-zone wells.

Included in the questionnaire was a request for the operators' opinion as to whether operating cost would be greater or less for multiple-zone completions. Numerous operators reported that, in their opinion, it would be less costly to operate a well completed in two zones as compared to operating two individual wells; whereas others were directly opposed to this view, on the ground that the well would require more servicing and supervision when producing from more than one zone. Because of the widely divergent answers to the question of operating cost, it appears that operators are not as yet in a position to support any conclusion on this point.

Conclusion

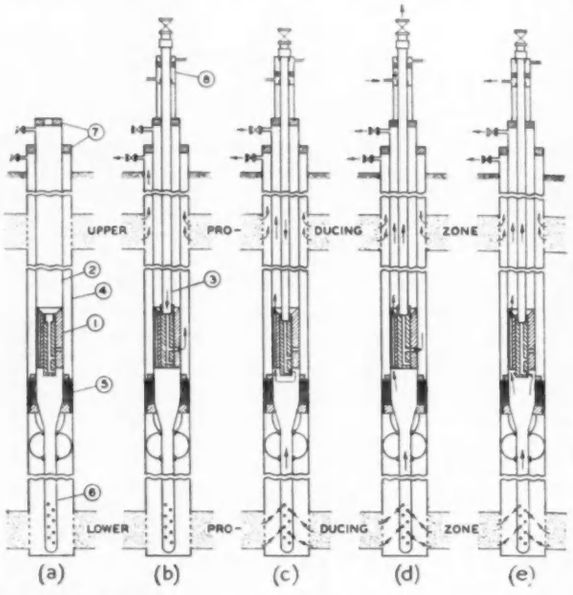
It will have been recognized by now that this paper is substantially a progress report of experience on multiple-zone practice accumulated by the industry to date. It is apparent that, for the most part, reliable data at present are limited to the earlier stages of multiple-zone production. Sufficient representative data on the later life of multiple-zone wells (especially during the period of artificial lift) are not as yet available to permit drawing definite conclusions as to the ultimate overall practicability of the method. Nevertheless, on the basis of the data submitted and analyzed, it would appear possible to arrive at some general conclusions. These conclusions are outlined as follows:

1. It is indicated that the initial completion of wells in more tha none producing zone can be accomplished successfully. Initial multiple completion may be expected to result in a saving of about 45 percent in steel consumption and approximately 40 percent in drilling costs, as compared to the drilling of 2 standard wells.

2. It does not follow that a successful initial multiple-zone completion ultimately will yield as satisfactory results as would single wells to the individual zones. Generally speaking, it is felt that this type of completion offers promise of being entirely satisfactory under conditions where consolidated productive formations exist and where final fluid volumes handled will come within limits of the permanent equipment in the well. On the other hand, when serious operating problems could be anticipated as a result of multiple completion, then the practicability of the method certainly would be questionable. For instance, if sand conditions necessitated screening of both zones, or if frequent work-over jobs were required, the overall result of a multiple completion might be distinctly unfavorable.

3. Insufficient data on account of limited experience under the different conditions existing preclude any firm conclusions regarding the application of artificial lift in multiple-zone wells.

4. It is indicated that the average operating costs for multiple-zone wells probably will be greater than for standard completions. This opinion is based on: 1, operation of the well will be more difficult, especially during artificial lift; and, 2, repair and work-over operations will be more complicated. Perhaps the lower initial well investment, together with benefits accruing as a result of undeferred production, would offset increased production costs.



1. Unloading Valve
2. Tubing
3. Macaroni Tubing
4. Casing
5. Removable Packer
6. Tail Pipe
7. Xmas Tree
8. Actuating Cylinder For Unloading Valve

Note: Automatic Timer is used to operate Cylinder (8) which raises and lowers Macaroni Tubing.

FIGURE 3
Typical Dual-Well Completion Method—Using Unloading Valve

Finally, it can be said, in spite of the uncertainties involved, that the necessity under existing conditions to produce the most oil with the smallest amount of steel expenditure encourages consideration of multiple-zone completions. Most of the problems in connection with the method appear to be mechanical ones. In this early stage of its development, the practice already has commanded the attention of both operators and manufacturers. The present situation concerning critical materials reasonably may be expected to result in an accelerated development of improved equipment and more advanced methods of application.

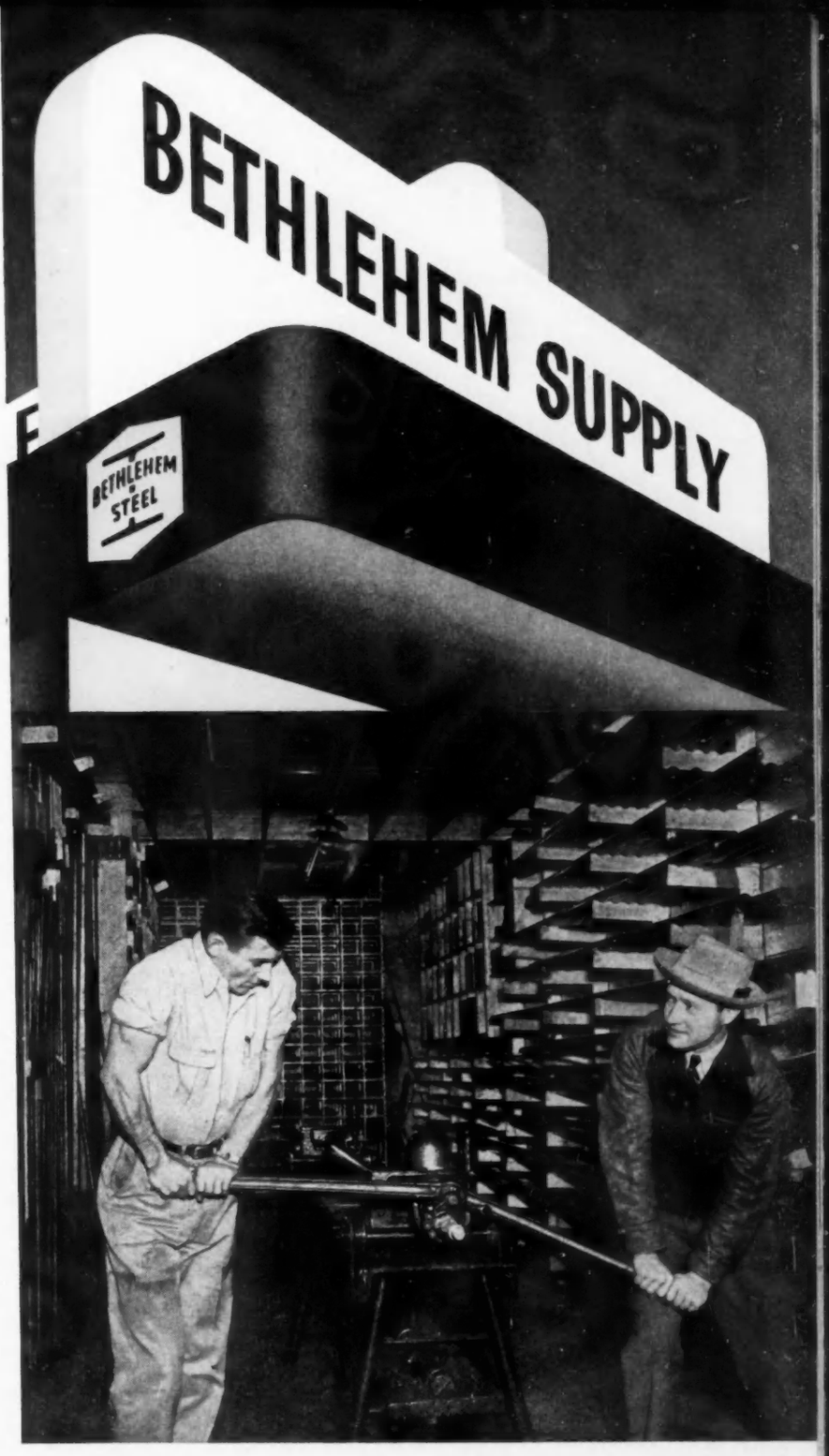
Acknowledgment

The authors wish to express their appreciation for the assistance of the membership of all topical committees on drilling and production practice in accumulating the data which were the basis for this paper.

Grateful acknowledgment is extended to all the operators who prepared questionnaires, without which active cooperation the study would not have been possible.

Especial thanks are due R. E. Bridges, of Humble Oil & Refining Company, and to W. S. Crake, Shell Oil Company, who worked with the authors in compiling and studying the data contained in the questionnaires.

Pumps fixed fast



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When the bottom hole pump has gone haywire and you want to get your well on the pump again in the shortest possible time, here's a good tip to remember: Bethlehem Supply can help you out.

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FOR SERVICE

PRACTICAL OPERATING *Hints* FOR

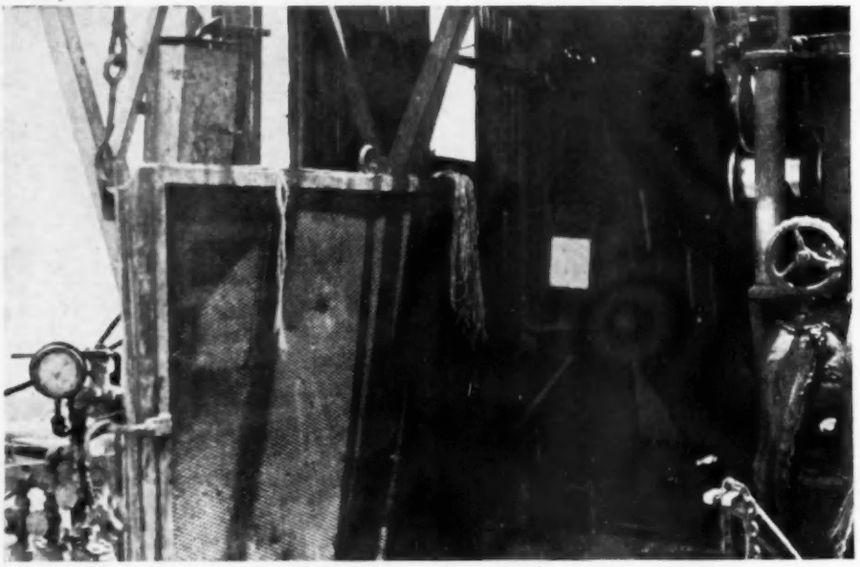
1. *RIG FLOOR HEATING*

Shielded Radiator for Better Crew Protection

MAKESHIFT heaters are frequently encountered at a drilling well, some crudely made of odds and ends of pipe left open in many cases causing men to be scorched if inadvertently leaning against them.

A heater observed at one drilling well is efficient as well as safely constructed. The coils are made of the usual pipe extending back and forth with welded turns, but is encased in a steel case having a solid back. A shallow rim is welded to the back of the case to which lifting rings are attached for ease when moving with a loading crane.

The front of the heater has a guard made of expanded metal lath covering the entire assembly of heating coils, and is located where the driller will receive the greatest benefit of the warmth when standing at the drilling controls in the early morning and on cold days.



Solid-backed steel radiator frame with inset grille of expanded metal conserves heat and protects against possible burning through accidental contact with heated steam-flow coils.

2. *UNITIZATION*

Combined Dog House And Water Tank Base

IN ORDER to make the field equipment as versatile as possible and thereby reduce transportation costs between well locations, one company builds up certain of their dog houses and small storage buildings in such a way that water tanks may at any time be mounted atop the structures.

In this instance, a small skid-based corrugated iron building used for handling and storage of sacked chemicals was strengthened with several additional 4-inch pipe vertical uprights brought up level with the peak of the roof, then reinforced with smaller horizontal members. All material was welded and the resulting platform base on the top was sufficiently strong to support a full tank of water.

This specially built structure has been found to be of great value when drilling in regions of irregular topography, where, on some locations, it is desirable to elevate the water tank higher than the nearest knoll will allow, in order to obtain the desired water pressure on the derrick floor.

3. *MUD HANDLING*

Hand Wheel Increases Suction Line Leverage

A CONVENIENT windlass for adjusting the mud-pump suction line on a unitized rig is used by a large oil company. Risers are welded to the pump discharge manifold and bent outward at an angle to clear surrounding pipe and fittings. Each riser is finished at the top with heavy tees as bearings for the windlass shaft, a third support being attached to the mud discharge loop to stabilize the center of the shaft span.

A large hand wheel is placed on the windlass at one side of the mud piping

Heavy posts supporting shelter roof extended to carry crossmembers forming platform upon which may be set elevated water tank or bin for storing cement or mud-treating chemical materials.

THE practical operating hints for the drilling rig, production man and pipeliner, appearing regularly in these pages, are secured from oil operations everywhere and offer suggestions that will help to improve operating efficiency and safety.

The items give an excellent picture of the remarkable ingenuity being exercised by the operating divisions of the industry. Contributions to these features will be paid for at the rate of $5 for each illustrated item accepted. Address contributions to "The Editor, The Oil Weekly, Houston,"

THE DRILLING RIG

Control of mud hose foot valve insured by large wheel mounted above mud-pump manifold valves.

where it is most convenient for the workman to operate. Holes in the end of the shaft passing through one of the supports are used with a pin for locking the suction adjustment at any point desired. A soft-laid wire line attached tc the windlass shaft and to the end of the suction pipe connects the two units.

4. *DRINKING WATER*

Wood Jacket Protects Double-Walled Cooler

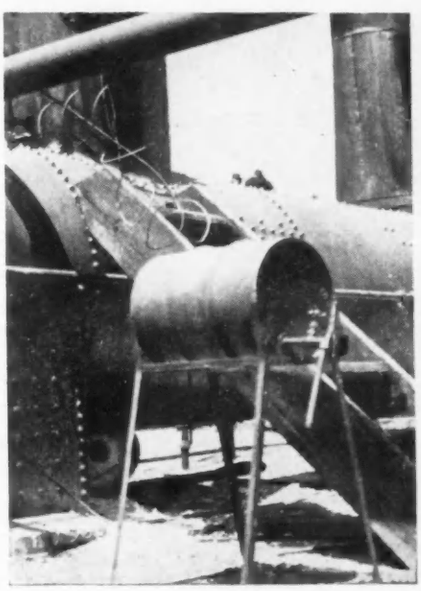
THE usual double-walled container for drinking water serves admirably to keep the contents from heating up, but the can itself is apt to suffer when loaded indiscriminately onto the truck with other equipment, or left on the rig workbench without protection. To safeguard the water can, one company puts together a slatted frame which encloses the entire cylindrical portion of the cooler, being held in place by dual, adjustable bands, and provided with notches in the base of the staves so that the guard remains properly in place.

With such an armor around the can, crushing is resisted, and sharp tools fended from the more perishable sheet metal. A water can thus protected is in much better shape to last for the duration than one exposed without armor to the severe treatment accorded such units.

Strapped around the vulnerable sides of water can, wooden staves intercept and absorb much abuse.

5. *DISTILLED WATER*

Open-Air Coil Fills All Rig Requirements



Air-cooling of tiny jet of steam keeps supply in drum replenished without requiring extra care.

DISTILLED water may be produced in quantities and available at any required time by using a set-up near an oil-field boiler. A receiver or distilled water accumulator is prepared by placing an oil drum on a four-legged rack beneath the steam header with the side bung uppermost, and the withdrawal bung fitted with a bushing and convenient piping.

A worm or condenser of small tubing or piping is attached to a bleeder valve on the lower side of the steam header with a control valve to regulate the quantity of steam withdrawn for condensation. The drum can be flushed frequently so that freshly distilled water is available for storage batteries or other uses as required.

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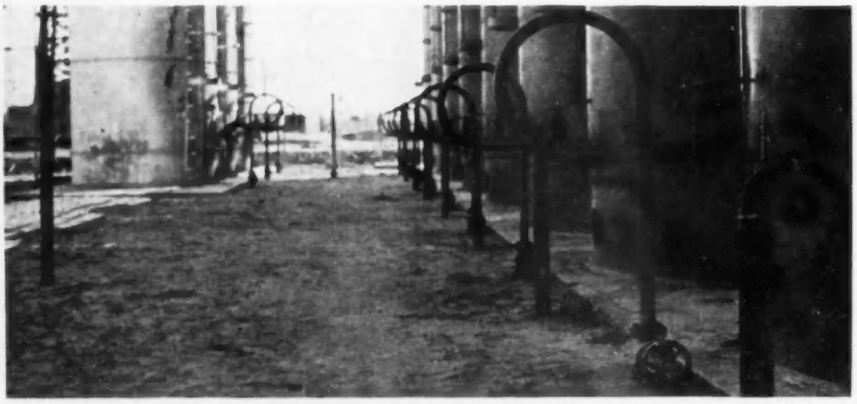
PRACTICAL OPERATING *Hints* FOR

1. *HEADERS*

Line Loops Absorb All Excessive Shock

WHEREVER extraneous shocks may be expected which may be transmitted to a battery of tanks through connected pipe lines with sufficient intensity to damage fittings, a large part of the stress can be absorbed by looping the connecting pipes between the tanks and the pump header.

The piping can be shaped by any of the approved methods so that each loop is exactly the same as another in order to obtain complete interchange. Bolted flanges on the ends provide means of connecting each end to gate valves, one at the tank outlet, and the other on a nipple above the pump header. This setting was installed primarily to provide safety in case of earth shocks.



Possibility of earthquake shock, as well as severance of flow lines from bulky tanks in case of sabotage or bombing explosions, insured by turning complete loop in each tie-in to main headers.

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2. *PUMPING ENGINES*

Muffler Location on Base Saves Strain

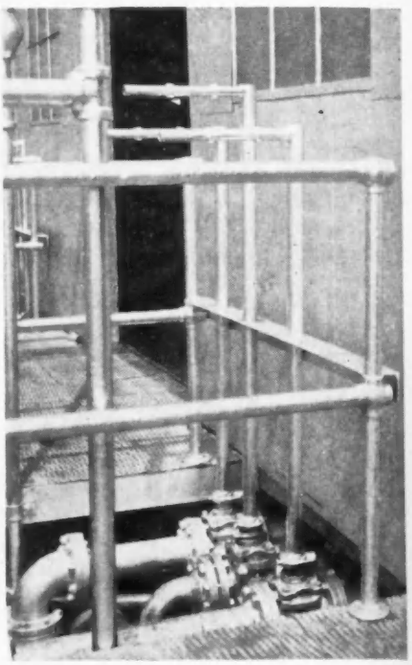
TO AVOID the need for cutting a hole through the sheet metal hood of a small internal combustion engine used on field gathering units, and to relieve the exhaust manifold of the weight of the muffler, one company makes a practice of laying the muffler on the concrete base supporting the pumping unit.

The exhaust manifold is equipped to lead the exhaust gases downward, the line angling toward the end of the unit and carrying the muffler on an ell at that point. This method of mounting permits expansion of the exhaust line without imposing strain on either muffler or manifold, and also enables condensation, formed when the unit is first started, to drain into the muffler and be blown clear without danger of water block and consequent breakage.

Vibration and stress on manifold sustained with overhead mounting eliminated through simple placing on concrete unit foundation.

3. *VALVE HANDLING*

Extensions Simplify Plug Valve Operation



Sockets and supporting frame permit convenient control of flow without requiring operator to work at or through station floor plates.

WHEN pressure lines are placed below ground in concrete lined conduits and covered with steel flooring, time can be saved and control of engines more quickly obtained when extension handles are provided for the plug valves. In this installation, pipe nipples high enough for the operator to work standing up have boxes attached to the lower end which fit snugly over the plug valve stem. Lips extending below the rim of the box and fitted with set screws keep the handles in place and prevent slipping.

When lubrication is required, the set screw is loosened and the stem removed

THE PIPELINER

until the correct number of lubrication sticks have been pressed into the plugs with the usual screw lubricator. Handles are welded to the top of the extensions at right angles to the vertical, all pointing one direction so that the operator can determine at a glance whether the valves are opened or closed.

4. LINE PIPE HANDLING

Pipe Wrappings Aided By Shear-Leg Buffers

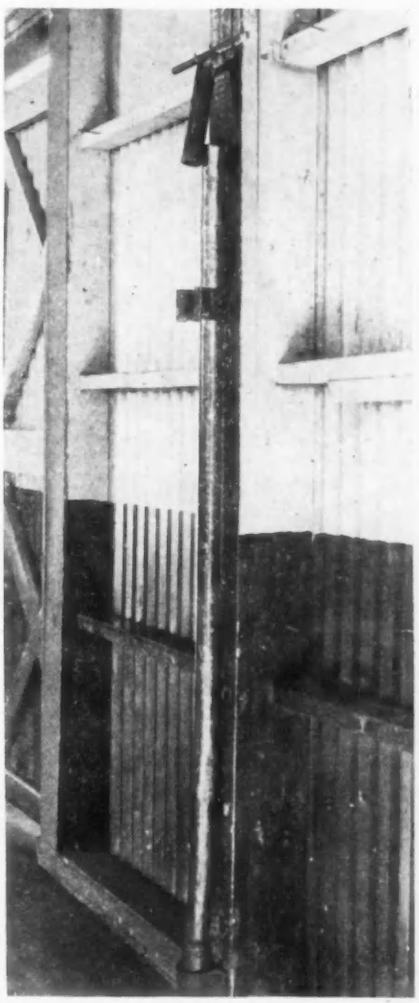
CHIPPING or damaging of the pipe coating if accidentally swung into contact with the shear legs of the tractor used for lowering the line into the trench is prevented by an ingenious use of old truck tires. The bead is removed, and the remaining tire cut radially with a hacksaw as far as the tread section. The strip thus formed is then opened out over the leg of the shear, and wired in place with a binder for each segment of tire thus formed.

This plan presents an unbroken rubber buffer throughout the length of the frame exposed to possible pipe contact, and eliminates the last minute patching which would be required in case of damage to wrapping or enamel coating.

Old casings, beyond repair, are cut from bead and wired along leg channels to prevent chafing.

5. STATION ACCESSORIES

Handy Keeper for Bar Used in Spotting Units



Socket and spring retaining clip enable this jacking bar to be out of the way yet accessible.

TO KEEP the jacking handle convenient, yet remove it from normal walkways in the station, one company fastens a stiff spring clip, of light gauge steel, to one of the uprights of the building, at a height equal to about three fourths of the handle length.

At the base, to insure retention of the handle, a socket of old belting is tacked or bolted to the building frame in such a manner as to form a pocket into which the bar fits. The pocket is fixed just above the level of the floor, so as to avoid presenting a catch-all for dirt and to permit the floor to be cleaned normally.

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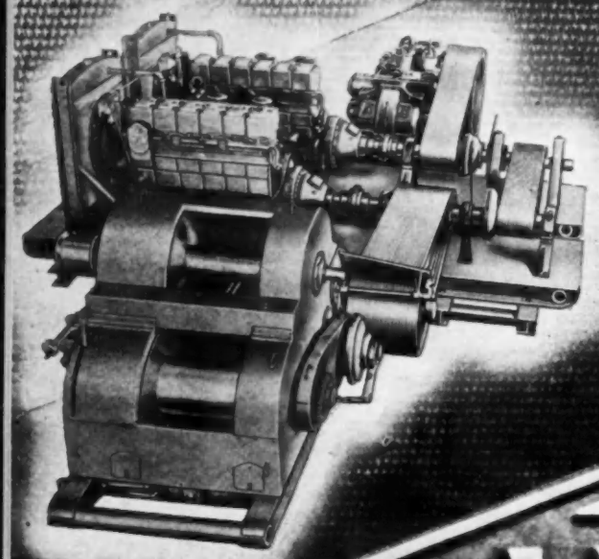

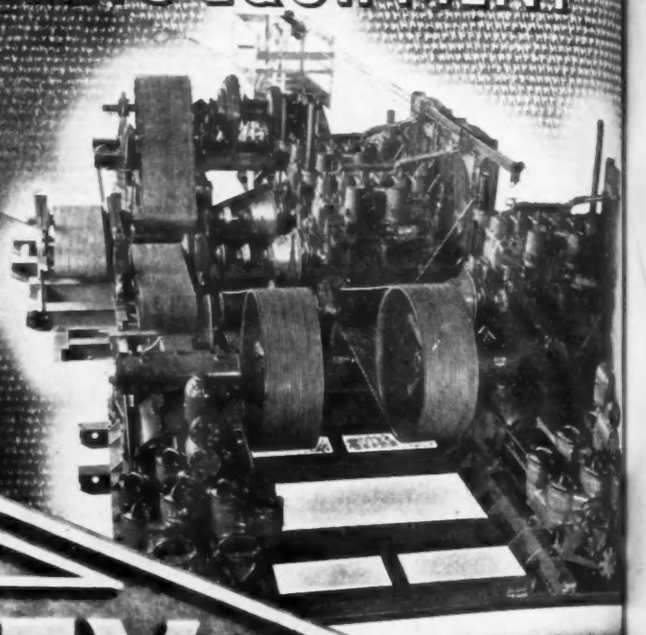

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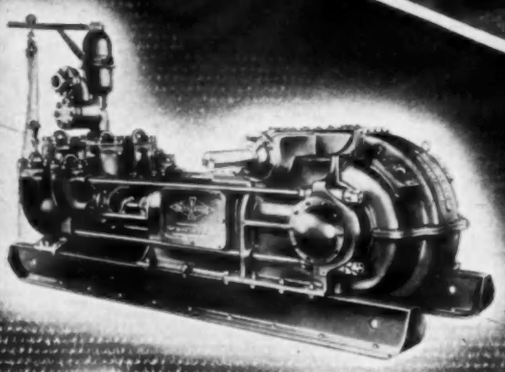

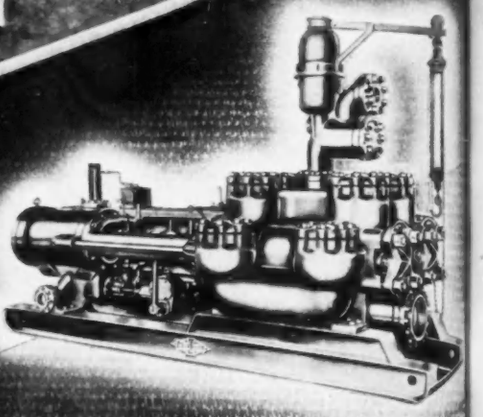

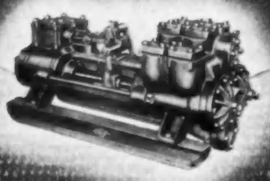

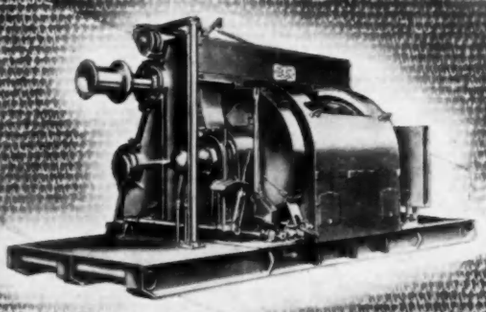

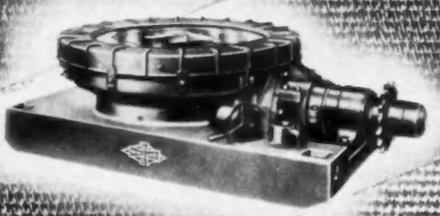

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The Week's News

Texas January Order Awaiting PAW's Order

Issuance of the January statewide order likely will be withheld by the Texas Railroad Commission pending a conference with E. DeGolyer, official of PAW, who is expected in Austin Monday.

Since no telegraphic instruction concerning January production had been received by the commission Friday, Commissioners Olin Culberson and Beauford Jester expressed belief DeGolyer would bring the figure with him. Jester said he, like Commissioner Thompson, will consider PAW instructions as orders of the commander-in-chief.

Texas Hearing Spends More Time on Salt-Water Program

The salt-water program for the East Texas field was the subject of primary interest at the statewide hearing before the Texas Railroad Commission last week. Shortly before the hearing was called, the commission announced that the effective date of its water-oil ratio order had been postponed until January 10. Whether another postponement would follow was the subject of speculation on the part of the operators.

F. W. Weeks, Tyler attorney, representing several operators who have filed suit against the order, urged the commission to suspend its order indefinitely, or else to adopt some form of the "Zeppa" plan. This program calls for the transfer of the allowable now assigned to wells producing large volumes of water over to the center of the field where it would be produced from other wells.

Culberson Opposes

Commissioner Olin Culberson read a statement asserting that he had not seen the order postponing the effective date of the water-oil ratio plan. He condemned the vacillating policy of what he termed the "working majority" of the commission. Commissioners Beauford H. Jester and E. O. Thompson did not offer any comment.

H. P. Nichols, representing East Texas land and royalty owners, likewise urged delay of the water-oil ratio order, or the institution of the "Zeppa" plan.

Nichols pointed out that the pressure had dropped only 2.3 pounds from September 1 to December 1, which he declared was a reasonable rate of decline and should cause no alarm.

Bryan Payne, president of the East Texas Salt Water Disposal Company, likewise urged the commission to postpone the water-oil ratio order. He said that the salt water company had revised its method of operations to eliminate the need for cement-asbestos pipe, which was needed if the water was to be transported west of the field and injected there, because they were unable to get this equipment. Members of the executive committee have agreed to inject water through ten wells. This does not require such elaborate equipment, Payne said.

He reported that the company was now disposing of 25,000 barrels of water daily and estimated that it would take 60,000 barrels by January 1, and 120,000 barrels by February 1, 1943. Large companies, Payne said, inject about 80,000 barrels of water daily, which indicates that a total of 200,000 barrels of water would be returned through the two plans by February 1.

Payne urged the commission to institute the "Zeppa" plan as a means of controlling immediately some 350,000 barrels of water. He thought also that this would avoid much litigation.

Humble Oil & Refining Company asked an increase of 5000 barrels daily in allowables from the Gulf Coast. J. A. Neath said PAW had requested the company to handle 5000 barrels more daily through its Baytown refinery.

Neath reported likewise that Humble had been requested to supply 22,000 barrels of heating oil daily, beginning January 15. This is to go through the reversed Pan American line to Longview and will be taken into the big-inch line there. Neath said that a letter from Major Parten indicated that the line would start handling 125,000 barrels of heating oil, and some crude oil beginning January 15.

Nominations for the state were up 4553 to 1,594,548 barrels. The largest decreases were 8792 for the East Texas field and 6608 barrels for West Texas. Gulf Coast nominations were up 10,515 barrels and nominations from the Corpus area were increased 4473 barrels. Increases of 3537 for East Central Texas and 2730 barrels for the Panhandle were reported also.

Kansas Hearing

Kansas Corporation Commission has set December 29 for the hearing to determine crude oil allowables for January.

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Compact Board Given Gloomy View of Future

E. DeGolyer, assistant deputy petroleum administrator for war, painted a gloomy picture of the outlook for new discoveries at the quarterly meeting of the Interstate Oil Compact Commission meeting in Oklahoma City last week. Prospects that are now considered of primary importance would have been in second or third place a few years ago, he declared.

DeGolyer discussed at length the present status of wildcatting, especially in the Mid-Continent and Coastal areas. The effort to find new fields, he said, as measured by the number of wildcat wells, geophysical crews and core drilling operations, is at an all-time peak. There were 3000 wildcat wells completed in 1941, and the number for 1942 will be about the same. During the first ten months of 1942 there were operating 222 seismic crews, on the average.

Results, however, have been inadequate, far below either hopes or necessities. For the past four years discoveries have been made at the rate of five or six hundred million barrels per year, as compared with consumption of one billion barrels annually.

Productive capacity is decreasing daily, and where it might be increased in the Gulf Coast or the Permian Basin, it would be of no help because of transportation limitations to the Atlantic States, New England and California, where it is needed. From 1934 through 1938 there were discovered 121 new fields with an average reserve of 1.8 billion barrels. Since then 242 new fields have been found, but the reserve average has dropped to 3 million barrels. DeGolyer saw no prospect of a change in this respect during 1942.

"I am advised," he said, "that the first class prospects of the recent search, are comparable to the second and third class prospects of a few years back. On such a basis, the outlook for discovery in the immediate future is not encouraging."

He stated that in the past the industry has searched primarily for the structural type of occurence. The structures being tested now are very small, and it appears that we are about out of structural prospects. This suggests that we must depend increasingly upon the discovery of the stratigraphic type of occurrence, such fields as East Texas, Burbank, Hull-Silk and the shoestring pools of Kansas."

Discovery of stratigraphic structures is much more difficult, he asserted they frequently required the drilling of eight or ten dry holes before the location for a definitive well could be determined.

"The problem of finding new reserves cannot be solved by the application of any single method. Existing data, geological and geophysical, must be restudied and reappraised in the light of our most advanced knowledge of oil occurence and we must be prepared to take longer chances in wildcatting than has been the custom during the past 10 years," DeGolyer said.

He declared that detailed surveys of the highest type of resolving power have yet to be made in certain sections of Texas, Louisiana, Arkansas, Kansas,

Oil Drilling Material Cut 50 Per Cent
WASHINGTON, Nov. 11.—Oil producers probably will receive no more than 50 per cent of their normal material requirements during 1943, Don R. Knowlton of the Office of Petroleum Co-ordinator in Washington declared in an address before the American Petroleum Institute in Chicago Wednesday.
making accurate SEISMOGRAPH SURVEYS doubly importan
Call in
G.S.I.

A prospective fifty per cent curtailment of materials in an already reduced drilling program doubles the need for the highest degree of accuracy and integrity in Seismograph Surveys. » New reserves must be found. Now, more than ever before, mature exploration judgment and long range planning are essential. » Neither time, materials nor money can be wasted on dry holes. Call in G. S. I. on your 1943 Exploration program.

GEOPHYSICAL SERVICE INC.

EUGENE McDERMOTT, President

SEISMOGRAPH SURVEYS

BRANCH OFFICE: HOUSTON, TEXAS

DALLAS, TEXAS

and other states which are now producing only a small amount of oil.

"In my opinion the finding cost entailed in the extensive exploration for stratigraphic traps and for additional structural accumulations in known or new areas could easily be at least twice as high as the present finding costs of some successful companies, which range from 20 to as high as 35 cents per barrel. These are costs for successful companies and do not take into account the large amounts of 'venture' money invested in the oil business that will never pay any return and in many cases is lost entirely."

He expressed the opinion that these higher costs would have to be borne by several companies on a cooperative plan, such as was common formerly in the Mid-Continent area.

DeGolyer recommended four definite means of attacking the problem.

1. The development, through research, of new technique capable of finding structures which have not been discovered by methods available now.
2. Integration and refinement of the most effective methods now in use in order to increase success in locating stratigraphic traps.
3. Intensive use of all known methods, as well as those which may be developed in the future, in areas not now productive but geologically favorable for its presence.
4. A cooperative and determined effort of all concerned to subordinate, for the duration of the war, all private interests in order that the nation's oil reserves may be increased to such an extent that there will be no possibility of an oil shortage to plague us during this emergency.

Arkansas Sour Gas Fields to Shut Down

The Arkansas Oil and Gas Commission has ordered a shutdown March 1, 1943, of the gas-distillate fields of Arkansas, prior to completion of desulphurization plants to handle the surplus gas from gas-distillate pools of Arkansas.

The action was taken following a statewide hearing of the(commission on December 15. Testimony was heard on perhaps a dozen or more cases.

Leading the opposition, spokesmen for Standard Oil Co. and The Atlantic Refining Company declared the closing of the fields would create a manpower problem and that experienced crews would probably leave the area and upon reopening of the fields inexperienced workers to be employed would have to handle the poisonous sour gas.

Distillate being produced in the fields was needed for transporting oil to the East Coast, both companies declared. A spokesman for Standard said lack of distillate from the fields during the winter months would reduce movement of oil in the company's pipe line to the East from 38,000 to 41,000 barrels daily to about 32,000 barrels daily.

The commission has announced an increase of 1,920,000 cubic feet of gas daily in production from the 22 natural gas fields of North Central Arkansas with a yield of 12,673,000 cubic feet daily for October last, comparable to September yield of 10,754,000 cubic feet daily.

The commission announced production in the 35 oil and gas pools of South Arkansas average 72,095 barrels daily for October.

[*Continued from page 13*]

has returned to his post as professor of economics at the University of Texas.

Pike came to Washington to take over his OPA job during the week, and at a press conference December 17, expressed his personal opinion that a price increase on crude oil would not solve the wildcat problem in which, he said, materials and manpower are currently the limiting factors. He also said he saw no reason for an over-all price increase to promote secondary-recovery, but did suggest that an increase might be made in the price of California heavy oils to increase production for the Navy.

He made it clear that he was expressing only his personal viewpoint since, he said, he did not yet even know what his job would be.

☆

BARGES: An ambitious barge program which will increase deliveries of Texas oil to the East Coast by 150,000 barrels daily was announced December 18 by WPB but with a warning that little, if any, relief can be expected from it before next spring.

The plan calls for the construction of 21 triple-expansion steam river boats of 2000 horsepower, 100 steel towboats using three diesel engines, each developing 200 horsepower, five hundred 6000-barrel wooden oil barges, 200 wooden merchandise barges, 200 wooden dry bulk barges to replace 259 steel barges now being converted to carry oil, and terminal facilities at Panama City and Jacksonville, Fla., and Cairo, Ill.

Part of the equipment will be used to transport 50,000 barrels of residual fuels daily from Texas to Panama City, for rail movement to Norfolk, Va., and Jacksonville. The oil reaching Jacksonville would move to consuming points along the Atlantic intracoastal waterway.

Another 50,000 barrels of any type of oil or products will be handled by the steel dry cargo barges now being converted, and a third 50,000 barrels, of residual fuels, will move from Port Arthur to Cairo by water, for transhipment to the rails for Eastern delivery.

☆

CONGRESS: Continuance of the Senate investigation of the oil shortage by a committee headed by Senator Francis P. Maloney of Connecticut was assured in the final days of the session by adoption of a resolution providing an additional $10,000 for expenses.

Questioned about what the committee was going to do, Maloney admitted that he did not know, but said the committee wanted to be prepared to meet any problems that may arise.

The Maloney committee made its first investigation last year, when it found the shortage of oil then predicted by Ickes was one of "surplus" only, and so reported, but later admitted it had been wrong and in subsequent inquiries sought to be helpful through suggestions for the speeding up and adoption of new methods of transportation.

The Senate also adopted a resolution sponsored by Senators Clark of Missouri, Reed of Kansas, Thomas of Oklahoma, Gillette of Iowa, Connally of Texas, Truman of Missouri and Capper of Kansas, providing for a special investigation with respect to the production, transportation and use of petroleum, fuel oil, gasoline, natural gas and other fuels in the region between the Mississippi River and the Rocky Mountains, with a view to recommending legislation to deal with a threatened shortage.

As Congress prepared to adjourn, the Senate accepted House amendments to legislation to encourage exploration on the public domain, and sent to the White House a bill providing that during the period of the present emergency the royalty on production from any new oil or gas fields discovered on the public lands shall be limited for a period of 10 years to a flat rate of 12½ percent.

☆

PIPELINE: Construction has started on an 8- and 10-inch pipe line from Paradis, Louisiana, to Port Arthur, Texas, by the Texas Pipe Line Company with the line due to be completed early in February. The line, project No. 14 of PAW, will provide transportation for special crude oils and will relieve barges for use in other areas. Heretofore, fields in South Louisiana have depended mainly upon barges and tankers.

The line will be 268.5 miles long with 8-inch being used from Paradis to Julien Station. The 10-inch will be used from the latter point to the terminus. The line will have a minimum capacity of 20,000 barrels daily with a maximum capacity of 45,000 barrels.

Less than six percent of new materials will go into the line. The company purchased Illinois Pipe Line Company's 10-inch from Del Rio, Texas, to Lytle, Texas, while the 8-inch was obtained from the company's facilities.

Pump stations will be built at Lafitte, Paradis, Houma, Amesville, Berwick, Julien, Erath and Homewood,

with possible more intermediate stations. The line also will serve the Erath recycling plant in Vermilion Parish.

Administrator Ickes last week clarified a statement made at his December 10 press conference that the big-inch pipe line now was being delayed by reason of difficulties in finishing equipment at the Bethlehem Steel Company.

A further investigation of the situation, he said, showed that the equipment actually went to Bethlehem only after another manufacturer reported he would be unable to meet the delivery schedule, and the company is handling the job so efficiently that the equipment will be delivered several weeks earlier than anticipated.

☆

STUDIES: A series of studies designed to develop more efficient operating practices and discover adequate substitutes for critical materials, has been arranged by PAW and PIWC, to be conducted by the latter's committee on production.

The committee is given wide latitude in the selection of subjects for investigation, and will act on suggestions from the council, PAW, district production committees or individual operators.

It is planned to set up five-man study groups, with four industry representatives who are specialists on the subject, and one PAW representative, to make the survey decided upon.

Possibilities of definite results from the investigations were seen by Deputy Administrator Ralph K. Davies. "Undoubtedly," Davies said, "these studies will prove valuable to the industry and to the war program by suggesting materials that can be used for the duration as substitutes for more critical goods. Too, it is not unlikely that the studies will develop more efficient operating practices which will be continued even after the war."

☆

PIWC: Membership of a committee to study the manpower problems of the industry and to confer thereon with Administrator Ickes and War Manpower Commission Chairman Paul V. McNutt, authorized at the December meeting of the Petroleum Industry War Council, was announced December 14 by Chairman William R. Boyd, Jr.

John M. Lovejoy, president of Seaboard Oil Company, New York, was named chairman of the committee, which will consist of Sidney Belither, executive vice president, Shell Oil Company, San Francisco; J. W. Carnes, vice president, Sinclair Refining Company, New York; N. C. McGowen, president, United Gas Pipe Line Company, Shreveport, and J. Howard Pew, president, Sun Oil Company, Philadelphia.

☆

RFC: Activities of Reconstruction Finance Corporation in the fields of oil and rubber are outlined in a report submitted to Congress in the closing days of the session.

Defense Plant Corporation, it was shown, has authorized $102,850,000 for four pipe lines from Texas and the Middle West, overland and through inland waterways, to the Eastern Seaboard—the big-inch line, to cost $95,000,000; the Trans-Florida eight-inch line costing $3,000,000; extension of the Plantation line to Richmond at a cost of $3,600,000, and the Fostoria-Akron line, to cost $1,250,000.

Defense Supplies Corporation has made commitments of $1,499,906,141 for purchase of aviation gasoline and component parts, and aviation-gasoline-plant expansion.

"The most extensive domestic procurement program instituted by Defense Supplies Corporation to date is that involving high-octane aviation gasoline," the report stated. "In order to assure adequate supplies of this most important material, Defense Supplies Corporation, at the request of the Army, Navy and OPC, has entered into contracts with substantially all refineries which are now, or expect to be, equipped to produce aviation gasoline, and in consideration of their agreement to produce aviation gasoline on a large scale, the corporation contracts to purchase their production.

"This production, which will involve substantially the entire quantity of 100-octane aviation gasoline produced in the United States and its territories, will be distributed to the armed forces of this country and its allies. The contracts are made with the cooperation of the office of the Petroleum Coordinator for War."

DSC also is bearing excess costs of moving oil to the East Coast area but the report gave no indication of the amount which is being expended for this purpose and also to absorb the higher cost of products purchased in District 2, although it said "none of the payments made under this program, and they will be large, will be recovered."

Rubber Reserve Company and Defense Plant Corporation, it was reported, now have arranged with 67 rubber, oil, chemical, utility and other companies to provide, construct or operate plants and facilities for the annual production of 663,000 tons of butadiene, 172,500 tons of styrene, and other necessary chemicals and catalysts to be used in the manufacture of 705,000 tons of the butadiene-styrene-copolymer type of synthetic rubber, 132,000 tons of butyl rubber, 60,000 tons of neoprene and 50,000 tons of Thiokol, at an estimated cost for plants and facilities of $564,361,220.

The company also had purchased up to October 31, 575,425 tons of scrap rubber at an aggregate cost, including freight, of approximately $18,460,540, and has sold 161,228 tons of reclaimers at ceiling prices at a substantial loss.

☆

RUBBER: The long-smoldering controversy between Reconstruction Finance Corporation and the Board of Economic Warfare burst into open flame during the week with publication by the Senate banking committee of testimony of Jesse Jones and Milo Perkins, the latter executive director of BEW, regarding the purchase of rubber and other strategic materials, while at the same time the synthetic-rubber program came in for more criticism from Senator Gillette, chairman of an agriculture subcommittee.

Perkins charged that as late as four months after Pearl Harbor, Jones had sent only one man to South America to develop sources of crude rubber. Previously it had been charged that the lack of an adequate stockpile of crude rubber when we entered the war was due to the RFC head's reluctance to pay a high price for East Indies crude rubber.

Gillette's subcommittee, seeking to force greater use of grain alcohol in the synthetic-rubber program, had before it Rubber Director William M. Jeffers and members of his staff, who again went over the story they had told several other committees of the plans for developing a rubber industry and the "valley of death" through which the country must pass next September, when stocks are expected to be at dangerously low levels and synthetic supplies not yet available in large amounts.

Fifty-two plants for manufacturing the basic materials of synthetic rubber are under construction or projected, the subcommittee was told. Of this number, 19 are in the northeastern area, 18 in Texas, 8 in Louisiana and Arkansas, and 7 in California.

Jeffers announced the appointment of a four-man rubber mission to the Soviet Union, where it will collect chemical and engineering experience on the manufacture of synthetic rubber, in which that country has been engaged.

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Markets • Statistics • Prices

Gasoline Stocks Rebuilt; Fuels Taken From Storage

Latest statistics of the industry, covering the week ended December 12, reflected continued difficulty in meeting requirements of light and heavy fuel oils, although there was a partial replenishment of gasoline stocks following the heavy withdrawals of the previous week, on the eve of extension of rationing throughout the nation.

Crude runs to stills averaged 3,744,000 barrels daily in the week of December 12, refineries having utilized 78.2 percent of their rated capacity. The runs were 16,000 barrels a day lower than in the previous week.

Gasoline production was up slightly at 11,261,000 barrels for the 7-day period, compared with 11,165,000 barrels the preceding week.

Stocks of finished and unfinished gasoline in the United States were increased 1,688,000 barrels during the week, from 75,934,000 to 77,622,000 barrels. That was more than a normal seasonal accumulation, and reflected letdown in sales of gasoline after motorists in formerly unrationed states filled their tanks to capacity. The ultimate effects of wider rationing still remain to be determined by subsequent statistics.

The 77,622,000 barrels of gasoline on hand December 12 were almost 10,000,000 barrels (11 percent) less than the 87,422,000 barrels reported as of December 13, 1941. However, the total demand for gasoline has been running about 16 percent lower in recent months than in the corresponding months last year, and for December, the Bureau of Mines estimated a decrease of at least 17 percent. Thus it appears that gasoline stocks of the country are substantially larger than prevailing demand requires. Moreover, there is not at present a normal distribution of the stocks, those in the Southwest and particularly the Gulf Coast having been made excessive by lack of adequate transportation outlet.

Not abnormal for the season was the 869,000-barrel withdrawal of gas oil and distillate fuel from storage in the week ended December 12. In the corresponding week last year about 1,300,000 barrels were withdrawn. The stocks on December 12 totaled 47,794,000 barrels. They were 5,713,000 barrels (10.6 percent) short of the 53,507,000 barrels reported December 13, 1941. The need for curtailment of the use of heating oil was attested by these figures.

United States stocks of residual fuel oil were further reduced 434,000 barrels in the week ended December 12, having come down to 74,785,000 barrels, a new low for many years. That amount was almost 20,000,000 barrels (20.7 percent) less than the 94,386,000 barrels on hand December 13, 1941.

Crude oil stocks again were drawn upon in the week ended December 5, when they came down 1,868,000 barrels in helping to supply plants that temporarily were exceptionally busy in the pre-rationing period. That draft on crude storage left on hand 232,982,000 barrels—only about 4,000,000 barrels more than the 20-year low of 229,000,000 barrels reached in late 1939 after the wide scale temporary shutdown of oil fields in the Southwest for two weeks.

Markets Settle Down Under Nation-wide Rationing

Markets generally were returning last week to a more normal basis, following the unusual situation in connection with the introduction of gasoline rationing in many states that previously were unrationed.

However, there was a very dull market on the Gulf Coast, which had depended more than most other areas upon localized business, because of inadequate transportation for out-of-district sales. Before rationing was extended, the district at least had comparatively good markets locally. But last week there was much sitting around waiting for business and counting coupons instead of filling orders.

In the upper Mid-Continent, the markets were making a better come-back, as the district shares more heavily in supplying the East and Middle West. Tank cars were available somewhat more readily than before in Oklahoma and Kansas, but Texas refiners still had difficulty in obtaining cars. Kerosine and fuel oils continued in strong demand.

Middle Western refiners and marketers found the market for gasoline

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

ITEM	Crude Oil Prod. Bbls. Day (Add 000)	Crude Oil Prod. Week Ended	Runs to Stills Bbls. Day (Add 000)	Runs to Stills Week Ended	Crude Stocks Bbls. (Add 000)	Crude Stocks Week Ended	Gasoline Stocks Bbls. (Add 000)	Gasoline Stocks Week Ended	Gas Oil & Distillate Stocks Bbls. (Add 000)	Gas Oil & Distillate Stocks Week Ended	Residual Fuel Oil Stocks Bbls. (Add 000)	Residual Fuel Oil Stocks Week Ended
Highs:												
1939	3,910	8- 5	3,650	10-21	278,607	5-26	87,769	4-22	39,562	10-28	116,237	8-26
1940	3,890	3-16	3,690	6-22	265,865	8-31	102,817	4-20	49,051	10-19	109,135	9-14
1941	4,337	11-22	[1]4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	[1]4,337	2- 7	3,961	1- 3	263,208	3-28	[1]107,229	3-14	49,861	11-14	95,857	1- 3
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 8
1940	3,335	11-30	3,370	1- 6	237,339	1-27	79,847	11- 9	23,551	4- 6	102,344	2-10
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	232,982	12- 5	75,934	12- 5	29,240	4-25	74,785	12-12
Trends in 1942 Week Ended):												
Jan. 3	4,038	.....	3,961	.....	244,440	.....	92,987	.....	49,357	.....	95,857	.....
Jan. 31	3,871	.....	3,848	.....	250,740	.....	97,810	.....	40,674	.....	91,189	.....
Feb. 28	4,016	.....	3,675	.....	259,373	.....	105,635	.....	34,547	.....	88,285	.....
Mar. 28	3,820	.....	3,667	.....	263,208	.....	105,624	.....	31,756	.....	83,045	.....
April 25	3,581	.....	3,506	.....	257,073	.....	102,897	.....	29,240	.....	81,107	.....
May 30	3,877	.....	3,522	.....	255,023	.....	95,355	.....	31,384	.....	79,628	.....
June 27	3,719	.....	3,581	.....	253,364	.....	88,396	.....	32,851	.....	77,394	.....
July 25	3,691	.....	3,658	.....	249,262	.....	82,281	.....	35,966	.....	77,816	.....
August 29	3,964	.....	3,697	.....	249,007	.....	80,831	.....	42,060	.....	78,034	.....
September 26	3,909	.....	3,802	.....	242,785	.....	80,550	.....	45,945	.....	78,943	.....
October 31	3,901	.....	3,731	.....	239,266	.....	79,159	.....	48,131	.....	79,166	.....
November 28	3,878	.....	3,736	.....	234,850	.....	78,854	.....	49,739	.....	77,796	.....
December 5	3,834	.....	3,760	.....	232,982	.....	75,934	.....	48,663	.....	75,219	.....
Dec. 12, 1942	**3,881**	.....	**3,744**	.....	.....	.....	**77,622**	.....	**47,794**	.....	**74,785**	.....
Dec. 13, 1941	4,110	.....	3,612	.....	[4]244,200	.....	87,422	.....	53,507	.....	94,386	.....
Change:												
In week	+47	.....	—16	.....	—1,868	.....	+1,688	.....	—869	.....	—434	.....
In year	—229	.....	+132	.....	—11,218	.....	—9,800	.....	—5,713	.....	—19,601	.....
In year	—5.5%	.....	—3.6%	.....	—4.5%	.....	—11.2%	.....	—10.6%	.....	—21.7%	.....

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, December 6, 1941

Crude Oil Production in the United States

(Estimates compiled by The Oil Weekly. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	*State Allowable of Crude Production	PRODUCTION IN WEEK ENDED Dec. 12	PRODUCTION IN WEEK ENDED Dec. 19
Arkansas	74,885	73,950	73,600
California	771,100	751,200	774,000
Long Beach	.....	34,500	34,200
Midway-Sunset	.....	56,800	57,300
Kettleman Hills	.....	41,000	41,400
Wilmington	.....	95,900	95,600
Rest of State	.....	523,000	545,500
Colorado	.....	6,750	6,650
Illinois	.....	254,050	240,850
Salem	.....	35,550	31,050
Louden	.....	41,500	44,300
Other New Pools	.....	159,200	154,100
Old Pools	.....	17,800	11,400
Indiana	.....	16,150	16,250
Kansas	295,500	284,700	305,700
Kentucky	.....	12,100	12,650
Louisiana	300,100	313,350	315,900
North	.....	92,850	92,400
South	.....	222,500	223,500
Michigan	63,675	59,200	60,350
Mississippi	.....	57,500	59,150
Missouri	.....	130	130
Montana	.....	19,250	29,050
Nebraska	.....	2,950	2,590
New Mexico	93,700	96,600	94,150
New York	.....	12,100	12,850
Ohio	.....	9,500	10,100
Oklahoma	373,900	349,300	357,150
Oklahoma City	.....	57,500	63,950
Seminole Area	.....	83,500	83,800
Rest of State	.....	208,200	209,400
Pennsylvania	.....	46,550	47,200
Tennessee	.....	30	30
Texas	1,372,859	1,386,000	1,391,900
Upper Gulf Coast	.....	312,800	314,300
East Texas Field	.....	359,100	358,500
Rest of Eastern Texas	.....	101,500	102,000
Lower Gulf Coast	.....	107,400	107,200
Southwest Texas	.....	50,500	50,300
South Central Texas	.....	17,700	17,500
West Texas	.....	207,900	208,900
North Texas	.....	136,300	140,400
Panhandle	.....	92,800	92,800
Utah	.....	15	15
West Virginia	.....	8,850	9,400
Wyoming	.....	95,750	93,800
Total 8 Prorated States	3,345,719	3,316,300	3,372,750
Total United States	.....	3,857,975	3,934,465

*Details on state allowables in The Oil Weekly of Dec. 7, page 52.

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for the Year Ahead

Whether with battle weapons, or with the hard-shooting McCullough Gun Perforator, we are resolved to put our bullets in the right place and with the greatest possible force behind them, contributing all that we can toward the Victory of our Nation in this war and in the peace to follow.

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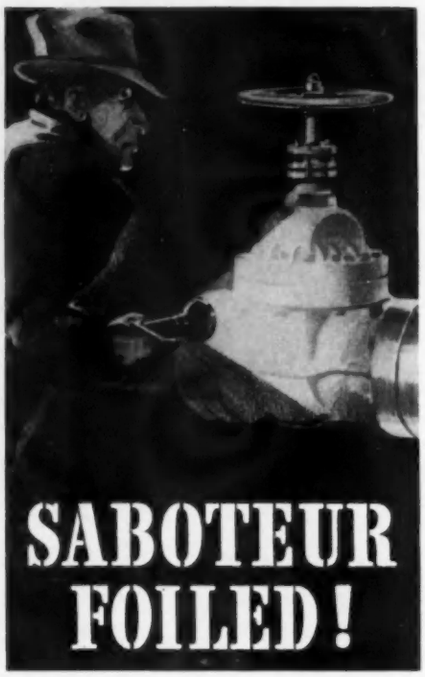

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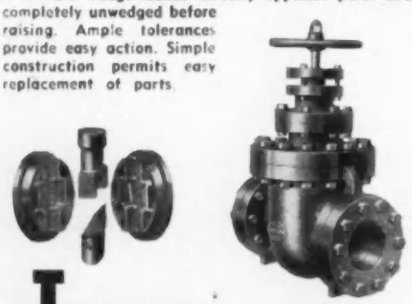

LUDLOW VALVES

SINCE 1866

unusually quiet, but other products, especially fuel oils, were in good demand, with supplies generally inadequate.

In the East Coast district there was no material change in the tight situation that has long prevailed. Suppliers continued finding difficulty in meeting needs of regular customers, and both light and heavy fuel oils remained especially scarce.

Crude Oil Production Of Nation Is Higher

United States production of crude oil averaged 3,904,465 barrels daily in the week ended December 19. It was 46,490 barrels a day higher than in the previous week and about in line with the federal government's wishes.

The eight prorated states, accounting for about 87 percent of the nation's production, increased their output to 3,372,750 barrels per day from 3,316,300 daily the previous week, and thereby went above their combined quotas of 3,345,719 barrels daily under the petroleum administrator's schedule of needed production for December.

California increased from 751,200 barrels daily in the week ended December 12 to 774,000 in the week of December 19. Kansas rose from 284,700 to 305,700, Louisiana from 313,350 to 315,900, Michigan from 59,200 to 60,350, Mississippi from 57,500 to 59,150, Oklahoma from 349,300 to 357,150, and Texas from 1,386,000 to 1,391,900. Arkansas declined from 73,950 to 73,600, Illinois from 254,050 to 240,850, New Mexico from 96,600 to 94,150, and Wyoming from 95,750 to 93,800.

Products Being Pumped Through Project-Five Line

Petroleum products are being pumped through the Project Five Pipe Line Corporation's new system running from Port Arthur, Texas, to Helena, Arkansas, one of the first OPC (later PAW) pipe line projects to be completed designed to step up deliveries to the East Coast.

The line is delivering approximately 25,000 barrels of gasoline or furnace oil daily to Helena where the products are then loaded on barges for movement up the Mississippi River. By March 1, 1943, it is expected daily deliveries will be increased to 55,000 barrels when more pumping stations are erected.

The system was built principally from existing lines and relocating others, using equipment from other areas. Gulf Refining Company reversed its 8-inch line north from Port Arthur. This line was tied in with another Louisiana line with a terminal at El Dorado, Arkansas. The El Dorado-Helena leg was formerly part of Magnolia Pipe Line Company and Gulf Refining Company's line from the Texas Panhandle to Ranger, Texas.

Those participating in the project besides Gulf, the largest owner, are Socony-Vacuum Oil Company, Inc., The Texas Company, Lion Oil Refining Company, and Premier Oil Refining Company.

Officers are E. C. Kincade, Gulf Oil Corporation, president; R. B. McLaughlin, The Texas Pipe Line Company, vice president; J. L. Latimer, Magnolia Pipe Line Company, vice president; Sylvester Dayson, Premier Oil Refining Company, vice president; and T. M. Martin, Lion Oil Refining Company.

Davies Reveals California Price Increase Probable

Prospect for an early increase in crude oil prices in California was indicated to be favorable by R. K. Davies in an address prepared for delivery at a mass-meeting of producers at the Biltmore Hotel in Los Angeles, December 16. Davies was unable to reach Los Angeles to deliver the address in person and it was read by the chairman.

The meeting was also addressed by Don R. Knowlton, director of production of the Petroleum Administration for War office, as well as Mortimer Kline, associate chief counsel for the administrator and L. L. Aubert and L. A. Cranson, California producers and members of the District 5 production committee. E. E. Pyles, chairman, District 5 Production Committee, presided.

The producer's meeting was held to coincide with the annual dinner meeting of the California Oil & Gas Association, which, this year, was held as a benefit for United Seamen's Service, Inc., and which was addressed by Henry J. Kaiser, shipbuilder and industrialist.

Kaiser declared in his address that as the oil supply areas narrow down through conquest by the enemy, the fields of North, Central, and South America take on new importance. In terms of available volume, American oil production quite literally has become the hope of the world, he said.

Kline presented an interpretation of the Executive Order of December 2, pointing out that the two all-important points covered in the order were: first, establishment of the oil industry as a critical industry and taking it out of "civilian" classification and placing it in the "claimant agencies" with respect to critical materials; and second, place the full powers of the President behind the recommendations of the administrator, making possible the imposition of penalties should such directives be disregarded by producers or others in the industry.

Alberta Making Record This Year

In the last 29 years, dating from the small Dingman "discovery" well in Turner Valley to the end of September this year, Alberta has produced 53,444,710 barrels of oil, according to records of the conservation board.

Most of this oil, 40,861,335 barrels, was obtained, however, in the past six years since the discovery of oil in quantity in the Turner Valley limestone in June, 1936.

In other words, Alberta produced more than three times the amount of oil in the last six years than during the preceding 23 years.

Available monthly production figures for 1942 indicate Alberta will have produced 10,000,000 barrels of oil by the end of this year.

This will set a new production record for Alberta. Oil production in 1941 was 9,908,643 barrels. The production in 1940 was 8,493,237 barrels.

Alberta authorities reveal that an agreement is being signed whereby Canadian National Railways will drill 50 wells in Vermillion oil field and the arrangement is expected to result in the reopening of the oil cleaning plant which closed down there some weeks ago when operators protested they were operating at loss under current prices.

U. S. Field Operations

Illinois Basin

Wayne County Wildcat Producing From McClosky

Wayne County wildcat makes 66 bbls of oil in 8 hours. Offsets staked to Jefferson County discovery. Second Devonian test in Clinton County pool finds pay. Wildcat in Clay County gets good show.

Wayne County: Deep Rock Oil Co.'s Atkinson 1, C NE SW 12-2s-6e, 5 miles south of the Covington pool and 6 miles southwest of Fairfield, swabbed 66 bbls of oil in 8 hours from McClosky at 3315-16 ft.

Deep Rock's Cantley 1, NW NW SE 7-1s-8e, a wildcat 5 miles north of Fairfield, was testing after acid treatments of 2000 and 5000 gallons in McClosky at 3281-83 ft; swabbed 25 bbls an hour for 7 hours after the initial acid.

Jefferson County: Lario Oil & Gas Co.'s Esmon 1, C SE NE 27-3s-4e, south offset location to pool opener, to be drilled soon. Roy Lee's McReynolds, C SE SE 22-3s-4e, north offset to discovery, clearing location.

The pool-opening well, Lee's Hopkins Community 1, C NE SE 27-3s-4e, has set casing on McClosky at 3102-07 ft. On a 30-minute drill-stem test, 2310 ft of clean oil was recovered. The test is ½ mile north of Belle River and is six miles from production.

Clinton County: Texas Co.'s Murphy 1, NW NE 2-2n-2w, 5 miles northeast of Carlyle, set casing on Devonian lime at 2623 ft, following a successful drill-stem test. The well is the second prospective deep producer in the area. The first, Frank Jones' Harrison 2, C SE NW 2-2n-2w, flowed 25 bbls of oil and 25 bbls of water 1 hour after a 1000-gallon acid treatment in Devonian at 2633-40 ft.

Clay County: Kingwood Oil Co.'s Gatewood 1, C W NE NE 23-3n-9e, north of Flora, set casing after drill-stem test on McClosky at 2983-86 ft. In 45 minutes 1000 ft of oil was recovered. The test is 1 mile southwest of the Flora pool.

Clay County: Texas Co.'s Kidwell 1, SE NE NW 15-5n-5e, pool opener near Iola, flowed 220 bbls of oil in 18 hrs from Benoist and Aux Vases sands at 2300-17 and 2341-60 ft. Oil shows reported in McClosky at 2431-37, 44-16, 49-57 and Cypress, 2148-56 ft. The company has three other locations on the lease.

White County: Phillips Petroleum Co.'s Kuykendall 1, S N½ NE NE 25-4s-10e, a semi-wildcat, has set casing on McClosky at 3075-85 ft. In an hour's drill stem-test at 3063-81 ft, 248 ft of oil, 124 ft of oil-cut mud and 465 ft of salt water were recovered. The test showed gas in 13 minutes. Casing will be perforated.

Indiana

Gibson County: Superior Oil Co.'s Hull 1, SE NE SW 30-1s-11w, wildcat midway between Princeton and Mt. Carmel, Ill., was drilling below 2441 ft, expecting to hit or miss at any time.

Posey County: Superior Oil Co.'s Carr 1, NW NE SW 29-4s-13w, wildcat 2½ miles northeast of New Harmony, is waiting on cement to test saturation in the Clore at 1885-1925 ft, with casing set to 1948 ft. Casing will be perforated opposite the pay. Wildcat is four miles from nearest production in the New Harmony pool.

Vanderburgh County: Three new operations are under way. Superior Oil Co.'s Nurrenbern 1, NW NW SW 32-6s-11w, moving in materials; George Nelson-United Oil Co.'s Stader 3, SW SE NW 32-6s-11w, location; Illind Oil Co. and Harry Lewis' Schuttle 2, SW SE SW 29-29-6s-11w.

Kentucky

Henderson County: P. O. Wall's Cabell-Crowder 1, NW NE NE 3-P-21, was moving in materials, an outpost test one-half mile east of Smith Mill pool. Gulf Refining Co.'s Williams 1, SE NW NE SE 24-Q-21, was completed in the Cypress at 2305-15 ft for initial production of 160 bbls a day, flowing, without shot.

Sinclair-Wyoming Oil Co.'s Burbank 7, NE Lot 13, 4-P-21, has set casing to test Cypress sand saturation at 2295-2304 ft. Is east outpost well in pool.

Union County: R. S. Gardenhire's Drury 1, NE SE NE 2-0-20, is a new wildcat location for McClosky test mile and one half southwest of Hitesville. D. C. Bintliff's Burbank 1, NE NE 20-0-17, is a new wildcat location 5 miles west of Spring Grove. In the Uniontown pool, Carter Oil Co.'s Robinson 1, NE SE SE 20-P-19, was waiting on cement with casing set to Waltersburg sand saturation at 1805-12 ft. Starting at surface elevation of 421 ft, Menard was topped at 1695 ft.

Results on Industry's Prospecting Fronts

Total oil discoveries for the year increased to 414 with recording during the week of 7 such discoveries among 44 wildcat completions. Altogether so far this year, 3007 wildcat tests have been completed. (See Tabulation this page.)

Michigan: Testing deeper at Headquarters.

California: Deep test may prove important.

Mississippi: State's deepest stops at 11,902 feet.

Kansas: New pool in Pratt County.

Gulf Coast: Revived wildcat makes producer.

ILLINOIS FIELD COMPLETIONS

Clay County: Pure's Kluthe 1, c se nw se 4-5n-7e, Weller 2494-2512 ft, 17 bbls, 2514 ft.
Texas Co.'s Hardin 1, nw ne se 20-5n-7e, abnd 2882 ft.

Fayette County: Carter's Rhedemeyer 7, c se ne sw 3-8n-3e, Weller 1491-97 ft, 96 bbls, 1500 ft.
Carter's Fortner 7-D, c ne se 10-8n-3e, Devonian 3133-35 ft, 150 bbls, 3135 ft.
Carter's Lilly 1, c se se nw 16-8n-3e, U. Pt Crk 1581-87 ft, L. Pt Crk 1595-1600 ft, 37 bbls, 1600 ft.

Franklin County: Ernest Eslick et al's Hudson-Jones 1, se sw nw 18-5s-2e, abnd 2756 ft.
Seaboard's U. S. Coal & Coke 6, c nw ne 23-6s-4e, Cyp 2833-39 ft, 68 bbls, 2839 ft.

Gallatin County: Carter's Busiek 1-A, c sw

U. S. Drilling Operations in Week Ended December 19, 1942

STATE	ALL WELLS COMPLETED — THIS WEEK Total	Oil	Gas	Dry	*Miscel.	Total 1942	Total this Date 1941	‡WILDCATS COMPLETED — THIS WEEK Total	Oil	Gas	Dry	Distillate	Total 1942
Alabama	....	....	....	....	....	3	5	....	....	....	....	....	3
Arizona	....	....	....	....	....	3	....	....	....	....	....	....	3
Arkansas	....	....	....	....	....	124	185	....	....	....	....	....	19
California	25	21	....	4	....	796	1,105	4	....	....	4	....	116
Colorado	....	....	....	....	....	15	21	....	....	....	....	....	3
Florida	....	....	....	....	....	1	1	....	....	....	....	....	1
Georgia	....	....	....	....	....	2	1	....	....	....	....	....	2
Illinois	39	22	1	13	3	2,158	3,871	4	....	1	3	....	585
Indiana	5	3	....	2	....	368	533	....	....	....	....	....	91
Iowa	....	....	....	....	....	....	6	....	....	....	....	....	....
Kansas	34	15	....	16	3	1,582	2,173	8	....	....	8	....	356
Kentucky	3	1	....	2	....	164	330	1	....	....	1	....	39
Louisiana	14	8	2	4	....	895	1,541	3	1	1	1	....	137
Michigan	12	5	....	7	....	654	863	3	1	....	2	....	175
Mississippi	....	....	....	....	....	100	198	....	....	....	....	....	42
Missouri	....	....	....	....	....	34	82	....	....	....	....	....	21
Montana	....	....	....	....	....	193	242	....	....	....	....	....	7
Nebraska	....	....	....	....	....	28	92	....	....	....	....	....	14
New Mexico	6	6	....	....	....	377	385	....	....	....	....	....	47
New York	....	....	....	....	....	1,192	1,086	....	....	....	....	....	1
Ohio	25	3	10	12	....	1,110	1,749	....	....	....	....	....	....
Oklahoma	30	13	6	8	3	1,393	2,114	5	2	....	3	....	287
Pennsylvania	43	39	2	2	....	3,804	3,897	....	....	....	....	....	....
Tennessee	....	....	....	....	....	8	23	....	....	....	....	....	5
Texas	72	38	3	29	2	5,092	10,247	16	3	....	13	....	1,042
Utah	....	....	....	....	....	....	3	....	....	....	....	....	....
Virginia	....	....	....	....	....	1	....	....	....	....	....	....	....
West Virginia	15	1	11	3	....	744	757	....	....	....	....	....	....
Wyoming	....	....	....	....	....	98	134	....	....	....	....	....	11
Total this week	323	175	35	102	11	20,939	31,644	44	7	2	35	....	3,007
Total last week	336	173	29	119	15	20,616	31,009	52	5	1	46	....	2,963
Total this year	20,939	10,796	1,821	5,522	2,800	.....	.....	3,007	414	57	2,528	8	....

* Includes old wells deepened, water intake, gas input, salt water disposal, and distillate wells.
‡ OPC program calls for 4,000 wildcats in 1942, of which 624 should produce oil and 116 gas, leaving 3,260 dry.

nw se 11-8s-10e, Palestine 1505-49 ft, Walts 1961-67 ft, Tar Spgs 2036-52 ft, 154 bbls, 2055 ft.

Phillips' Timber 1, ne ne nw 21-8s-10e, abnd 2915 ft.

Hamilton County: Cherry & Kidd's Gardner 3, c w½ se ne 24-3s-7e, Aux V 3241-53 ft, 55 bbls, 3253 ft.

Texas Co.'s Minton 5, c sw se ne 20-4s-7e, abnd 3458 ft.

Gulf's Sneed 1, c e½ sw ne 20-4s-7e, Aux V 3281-3303 ft, 82 bbls, 3303 ft.

Shell's Cox 1, sw ne se 12-6s-5e, Aux V 3054-90 ft, 36 bbls, 3305 ft.

Carter's Mayberry 2, se nw se 12-6s-6e, abnd 3079 ft.

Jasper County: Gulf's Hulse 1, se ne se 23-5n-10e, McC 2936-39 ft, 6 bbls 18 hrs, 2957 ft.

Gulf's Miller 1, c se se sw 23-5n-10e, abnd 3039 ft.

Lawrence County: Smith & Nye's Spidel 2-B, c n½ s½ se 23-2n-12w, Biehl 1350-88 ft, 250 bbls, 1388 ft.

J. S. Young's O'Donnell et al 2, c n½ ne ne 26-2n-12w, Biehl 1393-95 ft, 40 bbls, 1395 ft.

Wabash County: Central PL's Liddle 1, c nw nw sw 26-1n-13w, abnd 2490 ft.

P. O. Wahl's Beaman 1, se nw se 27-1n-13w, abnd 1786 ft.

Washington County: Kingwood's Brink 8, c ne ne se 15-1s-1w, Bethel 1517-32 ft, 24 bbls, 1532 ft.

Kingwood's Brink 7, c nw ne se 15-1s-1w, Bethel 1529-38 ft, 180 bbls, 1538 ft.

Wayne County: Gulf's Garrison 1, c se se nw 19-1s-5e, Aux V 2852-74 ft, 50 bbls, 2874 ft.

W. C. McBride's Gregory 1, c nw nw ne 30-1s-5e, McC 2971-88 ft and 3050-53 ft, 4 bbls, 3055½ ft.

Schulte & Wix's Atkinson 2, c sw nw se 11-1s-7e, McC 3234-39 ft, 197 bbls, 3250 ft.

Gulf's Carter 1, e½ ne sw 2-2s-7e, L O'Hara 3214-20 ft, 19 bbls, 3300 ft.

White County: Jarvis Bros. and Marcell's Gardner 2, c se se nw 31-4s-11e, Tar Spgs 2318-36 ft, 180 bbls, 2338 ft.

Tide Water's Bacon 13, se sw ne 5-5s-14w, Aux V 2852-77 ft, 33 bbls, 2877 ft.

Magnolia's Sisson-Higgins 17, sw se se 24-6s-10e, abnd 2290 ft.

Magnolia's Sisson-Higgins 18, se se se 24-6s-10e, abnd 2313 ft.

Cities Service's Mounts 7, ne nw nw 12-7s-8e, Walts 2198-2213 ft, 80 bbls, 2213 ft.

Hiawatha O&G's Stinson 10, sw nw ne 19-7s-11e, Aux V 2717-25 ft, 52 bbls, 2900 ft.

ILLINOIS WELL DEEPENED

Effingham County: H. Luttrell et al's See Est. 1, nw nw ne 34-6n-5e, Aux V 2355-76 ft, otd 2309 ft, 75 bbls, 2376 ft.

ILLINOIS WILDCAT COMPLETIONS

Clinton County—Failure: Olson Drlg.'s H. B. Alberternst 1, c sw ne nw 29-2n-4w, abnd 3250 ft.

Hamilton County—Failure: Oil Carrier, Inc.'s Rose 1, c sw ne se 36-3s-5e, abnd 3453 ft.

Macoupin County—Gas Field: J. A. Hirsh et al's Brenegueman 1, c nw nw nw 17-8n-8w, 100,000 gas, 393-418 ft, 654 ft.

Marion County—Failure: A. J. Hammer et al's C. Adams 1, c nw nw ne 8-3n-1e, abnd 1726 ft.

ILLINOIS WELLS DEEPENED

Clinton County—Failure: Pritchard & Livermore's Holliday 1, c se ne nw 31-2n-7w, abnd 2039 ft.

Gallatin County—Failure: Delta Drlg.'s Stinson 1, c e½ se sw 9-9s-9e, abnd 2795 ft.

ILLINOIS WILDCAT STARTS

Bond County: W. C. McBride, Inc.'s A. M. Keith 1, sw sw nw 30-4n-2w, dr.

Christian County: Roy Lee Trustee's Nichols 1, se se sw 28-11n-1e, dr.

Madison County: Roy Powers' Kaufmann-Isenberg Comm. 1, sw ne ne 21-5n-6w, lcn.

Marion County: Lario O&G Co.'s J. D. Halson 1, c sw ne 17-4n-4e, lcn.

W. P. Muller's D. Sloan 1, se se se 2-3n-1e, dr.

St. Clair County: Smokey Oil Co.'s Emma Morris Comm. 1, se se 14-1n-6w, lcn.

Smokey Oil Co.'s Kinsella 1, nw se 16-2n-8w, lcn.

Wabash County: Dean & Morton's B. Townsend 1, ne ne sw 14-1s-13w, lcn.

White County: N. E. Marshall's Justice 1, se nw ne 20-6s-8e, lcn.

Sinclair-Wyoming's Wilson 1, sw ne se 18-7s-9e, dr.

Williamson County: Dick Walters et al's Anders 1, nw nw se 9-9s-2e, dr.

INDIANA FIELD COMPLETIONS

Gibson County: McGinnis & Bittler's Joe Carithers 1, nw ne se 26-1s-10w, Hardins 1323-33 ft, 25 bbls, 1340 ft.

Posey County: Carter and Gulf's Ferdinand Oeth C-76-2, c se sw se 36-6s-14w, abnd 1297 ft.

Sinclair-Wyoming's Hageman 5, se nw se 1-7s-14w, Cyp 2453-74 ft and 2486-94 ft, 48 bbls, 2505 ft.

Sullivan County: J. H. Gilliam's Campbell & Woodard 1, c sw sw 34-9n-10w, abnd 2417 ft.

Vanderburg County: Sells Pet. Co.'s McCarty 4, se sw nw 32-6s-11w, Walts 1770-86 ft, 75 bbls, 1786 ft.

INDIANA WILDCAT STARTS

Perry County: Persise & Wyman's Wm. Gulliam 1, c s½ sw sw 24-4s-2w, lcn.

Warrick County: Ohio Oil's Richard Jones 1, ne ne sw 20-6s-8w, lcn.

KENTUCKY FIELD COMPLETIONS

Henderson County: Farm Bureau & Delta Drlg.'s C. D. Burbank 2-A, 24-Q-21, Cyp 2306-14 ft, 100 bbls, 2314 ft.

Union County: Phillips' Kington Coal Co. 2, 5-O-20, abnd 2667 ft.

KENTUCKY WILDCAT COMPLETION

Daviess County—Failure: J. C. Miller's R. Lytle 1, 5-N-29, abnd 1166 ft.

Oklahoma

Pontotoc County Productive Area Defined by Failure

What appears to be a Hunton lime pool has been opened in Seminole County at Continental and Kerlyn Oil Co.'s Scott 1, NW SW SW 3-10-7e, which drilled the formation from 4180-4200 ft, and on drill-stem test made 120 ft of oil and drilling mud with considerable gas. Bottom-hole pressure was 1700 pounds. Pipe is being run to test. Same operators last week found saturation in Hunton at Weaver 1, NW NE NE 32-8-3e, which is drilling Wilcox without a complete test being made of the lime.

Pontotoc County: Sledge field has been defined to the west by W. A. Delaney's Goodson 1, CSE NE 27-5n-5e, which failed to find Viola saturated. A second well drilled by the same operator, J. Goodson 1, CNE NE 27-5-5e, flowed at a rate of 408 bbls daily from the lime. Other locations have been staked by the operator with indications being that the pool will be actively developed.

Carter County: Lloyd Noble's (Samedan Oil Co.) Tomlinson 1, NE SW SW 13-5s-1e, north offset to the field discovery and second well to be drilled on the prospect, is producing from Springer sand at 3965-4115 ft, but at a depth of about 700 ft greater than in the discovery. Either closure is great or difference indicates fault existence, the latter suggestion supported by a considerable difference in gravities; 39 in the discovery and 30 in the recent test. On production, Tomlinson 1 made 496 bbls through 2-in tubing in 12 hrs.

OKLAHOMA FIELD COMPLETIONS

Bryan County—Cumberland: Pure's Little 2, c se se sw 27-5S-7e, sand 5610 ft, flow 936 bbls, 5710 ft.

Carter County—Semi-Wildcat: Allied Materials Corp.'s Gray 1-A, c nw se 9-1s-3w, sand 2723-72 ft, pump 60 bbls, 3205 ft.

Creek County — Hickory: J. E. Crosbie's Deer 1, c ne sw 2-14n-7e, Inola 3032 ft, 5 mcfg, 750 lbs rock press, 3107 ft.

Creek County—Glenn Pool: Gulf's Berryhill 28, c sw sw 9-17n-12e, Glen 1417 ft, pay 1417-1586 ft, input 1586 ft.

Gulf's Berryhill 30, nw se sw 9-17n-12e, Glen 1384 ft, 10,000 input, 1556 ft.

Gulf's Rhodes 26, c w½ nw nw 21-17n-12e, Glen 1429 ft, pay 1451-1525 ft, shot 200 qts, 16 bbls oil, 28 wtr, 1525 ft.

Garvin County—Paul's Valley: Ohio-Sun's Tetter-Adams B-1, c se sw 30-4n-1e, base Penn 4007 ft, pb 3700 ft, salt wtr disposal well, 4206 ft.

Grant County — Deer Creek: Prunity Prod. Co.'s Lore 1, c se ne 22-27n-3w, Oswego 3734 ft, pb 3808, 4000 gal acid, 30 bbls, 4072 ft.

Hughes County—Unnamed: Grimes' Bailey 1, se nw sw 19-8n-11e, Gilcrease 2869 ft, pay 2892-93 ft, 14 mcfg, 950 lbs rock press, 2893 ft.

Lincoln County—Unnamed: Portable's Murray 1, c nw se 24-13n-4e, 2nd Wx 5117 ft, abnd 5125 ft.

Noble County — East Lucien: Dancigar O&G's Inselman 2, c nw se, 5-20n-2w, Wx 5386 ft, 25 bbls oil & 20 bbls wtr 24 hrs, 5387 ft.

Okfuskee County — Unnamed: Doke & Hughes' Hensley 2, nw ne nw 21-13n-9e, Dutcher 3181 ft, abnd 3426 ft.

Oklahoma County—Edmond: Harper Turner's Harper 12, c nw ne 17-14n-2w, Bartlesville 5871 ft, 42 bbls, 1/8-in, 5901 ft.

Okmulgee County — Mounds: Klingersmity's Powers 2, ne nw se 19-16n-12e, Dutcher 2186 ft, 4 mcfg, 2201 ft.

Pawnee County—Keystone Dist: Wood Oil Co.'s Mary L. McCoy 1, c e½ e½ w½, 5-20n-9e, sand 2347 ft, pay 2348-54 ft, 5 mcfg, 2354 ft.

Pottawatomie County — Semi-Wildcat: Atlantic et al's Whistler 1, nw sw se 18-11n-5e, Wx 4835 ft, pump 285 bbls, 4853 ft.

Seminole County—Wewoka: Sinclair Prairie's Jennings 1, c sw se 8-8n-8e, Hunton 3917 ft, 2000 gals acid, 80 bbls, 4205 ft.

Stephens County — Velma: Geo. Hollingsworth's Fee Cases 2, ne sw se 36-1s-5w, 18 bbls, 834 ft.

Skelly's Stephens 1, sw nw ne 36-1s-5w, abnd 2017 ft.

Sinclair Prairie's Lowery 1, nw sw nw 6-3S-5w, lime 901 ft, pay 1060-70 ft, pay 1156-78 ft, 1000 gals acid, pb to 1279 ft, 88 bbls oil, 12 wtr, 2115 ft.

Tulsa County—Manford: Johnson's Bailey-Grimes 8, c n½ ne sw 31-19n-10e, Arb 3230 ft, abnd 3237 ft.

OKLAHOMA WELLS DEEPENED

Creek County—Kellyville Dist.: E. Shamblins' Horaney 1, sw se nw 18-17n-11e, otd 2261 ft, 2 mcfg 24 hrs, 2441 ft.

Oklahoma County—Oklahoma City: British-American's Burnham 1, c s½ nw sw 23-12n-3w, otd 6588 ft, Wx 6347 ft, pay 6556-95 ft, shot 180 qts 6556-95 ft, pump 318 bbls, 6599 ft.

Peppers' Turner 1, 275 ft n of ne ne ne 34-12n-3w, otd 6457 ft, abnd 6657 ft.

Seminole County—Bowlegs: Texas Co.'s Reed 1, se se ne 14-8n-6e, otd 4174 ft, 2nd Wx 4242, 13 bbls oil, 160 wtr, 4242 ft.

OKLAHOMA WILDCAT COMPLETIONS

Lincoln County—Failure: Portable's Murray 1, c nw se 24-13n-4e, Avant 2230 ft, Hogs 2530 ft, Cvb 2905 ft, pink lm 4100 ft, Bart 4208 ft, brown lm 4330 ft, Mayes 4625 ft, Wood 4835 ft, Hunton 4880 ft, Syl 4888 ft, Viola 5000 ft, Dense 5037 ft, Dolo 5050 ft, abnd 5125 ft.

Murray County—Failure: J. W. Duton's Bristol 1, c nw nw sw 9-1n-2e, Dolo 2270 ft, Penn 1980-98 ft, Bromide 2025 ft, McL 2610 ft, Basal McL 2918-3940 ft, Oil Creek 3042 ft, abnd 3512 ft.

Noble County—Failure: Engling & Parker's Rosencrants 1, nw nw se 14-24n-1e, Paw 1881 ft, U. Hoover 1947 ft, Base Oread 2275 ft, Indi 2349 ft, Tonk 2625 ft, Lay 3241 ft, abnd 3286 ft.

Pottawatomie County—New Field: Cities Service's Goodwin 1, c ne sw 23-8n-4e, Belle City 1894 ft 1st Calvin 3072-97 ft, Senora 3653-62 ft, Earls 3692-3719 ft, Mayes 3890 ft, Wood 3912 ft, Mise 3890 ft, Hunton 3995 ft, Syl 4182 ft, Viola 4290 ft, Dense 4337 ft, Dolo 4366 ft, Wx 4439 ft, 2nd Wx 4355 ft, 50 bbls oil, 50 water, 4560 ft.

Atlantic et al's Whistler 1, nw sw se 18-11n-5e, Belle City 2090 ft, Hogs 2430 ft, Checkerboard 2760 ft, Osw 3550 ft, Prue 3555-3600 ft, brn lm 4185 ft, Mayes 4405 ft, Hunton 4632 ft, Syl 4651 ft, Viola 4757 ft, Dense 4793 ft, 1st Wx 4835 ft, 285 bbls, 4853 ft.

OKLAHOMA WILDCAT STARTS

Coal County: Stanolind et al's Cushing 1, Royalty Corp. B, nw ne se 22-3n-9e, 6500-ft test, lcn.

Lincoln County: Murray et al's Barnes 1, c sw se 19-13n-5e, 10-in @ 82 ft, dr 2860 ft.

Oklahoma County: Kerlyn's Kenkins 1, ne ne sw 28-13n-3w, rur.

Kansas

New Arbuckle Field Opened in Pratt County

New lime pool in Pratt area. Simpson showing in Lake City. Misener show may indicate third zone at Lindsborg. Canton extended.

Pratt County: Hollow Drilling Co.'s 1-B, SW SE SE 29-26-12w, northeast of Iuka production, has opened a new Arbuckle lime field. Well drilled to 4289 ft after topping formation at 4268 ft. Casing set 1 ft into pay, and section treated with 2000 gallons of acid after which it swabbed initially 42 bbls of oil in 15 hrs. Tankage being erected for completion test.

Barber County: Simpson broken sands are showing on incomplete tests at Auto Ordnance's Gant A-2, field well, SW SW SE 7-31-13w, which made 11 bbls of oil and 27 bbls of water in 24 hrs from 4528 to 4566 ft.

McPherson County: Misener sand has been drilled and a show encountered at a location southwest of the southwest extension of Lindsborg field,

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which now produces from Viola and Simpson. Well is Lario's Errickson 1, CW½ SE SW 35-17-4w, with top of the sand shown at 3458 ft.

Canton field has been given another producer in the new northeast extension area in Mississippi chat at Winkler-Koch, Inc.'s, Cunningham 1, CN½ NE SW 25-18-1w, which topped the formation at 2824 ft and logged saturation from 2824 to 2828 ft.

KANSAS FIELD COMPLETIONS

Barton County—Kraft-Prusa: Black-Marshall's Hitchman 1, c sw se 32-16s-11w, Arb 3315 ft, pay 3321-24 ft, 2000 gals acid, 2479 bbls, 3326 ft.

Barton County—Kruckenber: Helmerich & Payne's Merten 1, c se sw 3-19s-15w, Basal 3552 ft, shot 60 qts, flow 15 bbls, pay 3563-82 ft, 3589 ft.

Cowley County — Semi - Wildcat — Burden: Great Lakes Carbon's Ewers 1, sw sw sw 31-31s-6e, Miss 3087 ft, abnd 3152 ft.

Cowley County—Morel Pool: Appleman & Roberts' Benson 1, nw ne sw 15-9s-21w, Arb 3718 ft, 2000 gal acid, 595 bbls, 3740 ft.

McPherson County—South Roxbury: Westgate-Greenland's Lilly 2, C s½ nw se 30-17s-1w, Miss 2672 ft, 6060 bbls, 2682 ft.

McPherson County—Lindsborg: M & L Oil's Carlson 2, c w½ sw ne 7-17s-3w, Viola 3391, 4000 gals acid, pump 389 bbls, 3397 ft.

Auto Ordnance's Community 1, nw nw se 8-17s-3w, Simp 3449, swab 1346 bbls, 3461 ft.

Phillips County — Semi - Wildcat — Dayton Area: Tom Allan and Kohen's Bogel 1, c se se 11-3s-19w, Lans 3164 ft, abnd 3430 ft.

Pratt County — Iuka: Cities Service's Helmke 1, c s2 se 1-27s-13w, Arb 4336 ft, pb 4253 ft, perf Simpson Dolomite, 8000 gals acid, abnd 4373 ft.

Reno County — Schweizer-Peace Creek: Stanolind's Schweizer 1, c s½ nw nw 31-22s-9w, Viola 3674 ft, 2500 gals acid, swab 1277 bbls fluid, 15% water, 3711 ft.

Reno County—Peace Creek: Cities Service's Lang B-1, sw nw sw 13-23s-10w, Kinderhook 3612 ft, 2000 gals acid, abnd 3776 ft.

Cities Service's Lang 1, sw sw sw 14-23s-10w, Viola 3787, pump 125 bbls, 3789 ft.

Lion Oil Ref.'s Baine 1, c ne ne 23-23s-10w, Viola 3780 ft, pump 50 bbls oil, 30 wtr, 3781 ft.

Lion Oil Ref.'s Blaine 2, c nw ne 23-23s-10w, Viola 3790 ft, abnd 3791 ft.

Reno County — Zenith Area: Auto Ordnance's Volker 1, c sw sw 6-24s-10w, Misener 3717 ft, pay 3722-29 ft, Viola 3734 ft, 1000 gals acid, flow 67 bbls oil 2 hrs, 3752 ft.

Rice County—Semi-Wildcat—Edwards Area: Helmerich & Payne and Bradley Bros. Kalnia 1, se se sw 3-18s-8w, Arb 3299 ft, abnd 3330 ft.

Rice County — Eberhart: Woodriver Oil & Ref.'s Doll 1, c n½ nw sw 19-19s-10w, Arb 3307 ft, pay 3318-22 ft, 3250 bbls oil, 3370 ft.

Phillips' Miner 2, c nw se 35-19s-10w, Arb 3277 ft, 3852 bbls, 3282 ft.

Rice County—Keesling Area: Cities Service's Coldwater C-1, c se sw 17-20s-9w, Arb 3222 ft, shot 5 qts, 2000 gals acid, pb to 3330 ft, pump 4½ bbls, 3335 ft.

Rooks County—Laton: Vickers' Baxter 1, c ne sw 3-9s-16w, Lansing 3106 ft, pay 3157-62 ft, 6000 gals acid, pump 384 bbls, 3199 ft.

Rush County — Otis Albert: Circle Pet's Schroeder 1, c s½ nw ne 26-18s-16w, Quartzite 3488 ft, abnd 3507 ft.

Russell County—Greenvale: Gulf's Irwin 1, c s½ se ne 8-15s-12w, K. City 2955 ft, pay 3018-25 ft, pay 3033-39 ft, pay 2973½-83 ft, pb to 3116 ft, set packer at 2990 ft, 2000 gals acid above packer & 2000 gals acid below packer, pump 724 bbls, 3261 ft.

Woodson County — Semi-Wildcat: C. E. Ash's Puckett 1, se se se 34-25s-14e, Barts 1382 ft, abnd 1460 ft.

OLD WELLS DEEPENED

Rice County—Silica: Gulf's Wendell 8, se sw se 32-19s-10w, otd 3307 ft, Pre-Cambrian 3818 ft, 200 gals acid, salt wtr disposal well, 3842 ft.

Russell County—Fairport: E. Corn et al's Kollman 2, ne nw nw 5-12s-15w, otd 2862 ft, Sooy 3116 ft, pump 10 bbls hr, 3121 ft.

KANSAS WILDCAT COMPLETIONS

Barton County—Failure: Phillips' Hawkins 1, c sw nw 3-19s-13w, Anhy 771 ft, Ft Riley 1805 ft, Topeka 2834 ft, Brown Lans 3159 ft, White Lans 3173 ft, Congl 3402 ft, Arb 3410 ft, abnd 3431 ft.

Graham County — Failure: Cities Service's Englebert 1, ne ne ne 4-6s-21w, Ft Riley 2480 ft, Topeka 3180 ft, Lans 3399, Base KC 3614, granite wash 3639, granite 3644, abnd 3644½ ft.

Reno County — Failure: Falcon - Seaboard and Globe's Altland 1, ne ne nw 31-25s-8w, Lans 3350 ft, Base KC 3855 ft, Miss 3878 ft, Viola 4192 ft, Simpson 4256 ft, Arb 4362 ft, abnd 4377 ft.

Shell's Warner 1, se ne sw 34-25s-8w, Top 2648 ft, Lans 3204 ft, Miss 3890 ft, Kinderhook 3890 ft, Misener 4122 ft, Viola 4123 ft, Simpson 4151 ft, Arb 4238 ft, abnd 4257 ft.

Russell County — Failure: Cities Service's Johnson 1, nw nw ne 22-13s-15w, Topeka 2790 ft, Lans 3965 ft, Congl 3333 ft, Arb 3349 ft, abnd 3369 ft.

Saline County—Failure: Adkins Oil's Andrews 1, ne nw nw 8-16s-1w, Lans 2051, Miss 2672 ft, abnd 2719 ft.

Stafford County — Failure: S. A. Murphy's Estey 1, c w½ sw ne 25-21s-11w, Lans 3073 ft, Cong 3374 ft, Simpson 3408, Arb 3467 ft, abnd 3500 ft.

Woodson County — Failure: C. E. Ash's Tuckett 1, se se se 34-25s-14e, B'ville 1382 ft, water 1443-60 ft, abnd 1460 ft.

Greenwood County—New Field: LeBlanc et al's Shell 1, nw nw se 28-27s-12e, pump 15 bbls, Miss 1604 ft.

KANSAS WILDCAT STARTS

Cowley County: D. D. Fowler s Tatum 1, c sw nw 12-31s-6e, dr 760 ft.

Mitchell County: Chas. Coats et al's Black 1-C, sw sw se 1405s-20w, mim.

Phillips County: Cities Service's Hansen 1-C, sw sw se 1045s-20w, mim.

Good & Floyd's Hoover 1, ne nw ne 31-3s-17w, Cem 8-5/8 in, 101 ft, dr 150 ft.

Pratt County: Barbara Oil's Ila Allmon 1, se se ne 22-26s-11w, brr.

Skelly's Knop 1-B, sw sw se 25-26s-13w, mim.

Reno County: Nadel & Gussman's McRevey 1, ne ne sw 33-23s-9w, rur.

Rice County: Chas. Coats et al's Hill 1, sw sw nw 33-18s-7w, lcn.

Bradley Bros.' Staatz 1, sw sw sw 11-18s-9w, mim.

Rooks County: Harbar Drlg. et al's Shaw 1, se se se 36-8s-16w, lcn.

Sheridan County: Union's Pratt 1, nw ne sw 23-8s-26w, lcn.

Stafford County: Vickers & Atlantic's Koehn-Laudick 1, c sw nw 16-21s-14w, lcn.

Cities Service's Grunder 1, sw ne ne 11-25s-15w, sd 235 ft.

New Mexico

Lea County Test Looks Good Below Permian

First deep test in Lea County enhances outlook for production below regular Permian zones through having passed up showings. Extension producer in South Eunice to be followed by more tests. Roosevelt County wildcat logged nominal shows in middle Permian.

Lea County: R. Olsen and Atlantic Refining Co.'s Langlie 1, C SE SE 11-25s-37e, east edge of Langlie field, was drilling chert at 7845 ft, and probably below the Permian series. This initial deep test for county logged adequate porosity and saturation at 4800-5000 ft to warrant further testing, and dolomite at 7670-7715 ft showed porosity with nominal oil stain and odor.

Texas Pacific Coal & Oil Co.'s State 23-A, C SE NE 8-22s-36e, situated in sparsely developed sector of South Eunice field, flowed 192 bbls of oil and 1,651,000 ft of gas initial after using 7000 gals of acid at 3870 ft. Company plans to continue development in the area. Tide Water Associated Oil Co.'s Alves & Howell 1, wildcat 5 miles south of Vacuum field, resumed drilling after landing protection string at 3241 ft.

Roosevelt County: Malco Refineries, Inc.'s, Bilberry 1, C SE SW 1-7s-37e, situated on top of the deep-seated granite ridge that extends east-west across the Permian basin, was drilling at 4840 ft in Yeso lime. Nominal shows of oil and gas were recorded at intervals below 4185 ft.

NEW MEXICO FIELD COMPLETIONS

Eddy County: Barney Cockburn et al's Etz 1-X, 675 ft from s and 660 ft from e lines 26-16s-30e, flow 125 bbls 2-in, shot 400 qts pay 3435-73 ft.

Barney Cockburn et al's Geo. Etz 13-X, 1980 ft from n and 630 ft from 3 lines 35-16s-30e, flow 265 bbls 2-in, shot 200 qts pay 3045-95 ft.

Continental's State 4-36, c nw nw 36-16s-30e, flow 135 bbls 2-in, shot 140 qts 2930-3030 ft, td 3038 ft.

Evarts Dr. Co.'s Grier 3, c sw se 30-16s-31e, pump 70 bbls, shot 320 qts pay 3246-3307 ft.

John N. Fidel et al's Grier 1, c se se 30-16s-31e, flow 75 bbls 2-in, nat'l, pay 3172-3267 ft.

Lea County—East Lusk: Carper Dr. Co.'s Miller-English 1, c sw nw 19-19s-32e, elev 3553 ft, salt 875-2215 ft, pump 200 bbls, natural, pay 2616-34 ft.

West Texas

Crane County Ordovician Test Plugs Back From Water

Crane County Ordovician prospect plugging back from water to try for oil completion. Scurry County deep wildcat reaches objective without shows. H. L. Hunt interests register three wildcat failures. Gaines County deep test has logged 1000 feet of section that has yielded oil and gas shows at close intervals.

Crane County: Gulf's Dawson 1-A, C S¼ W¼ H&TC 10, blk 6, established water table in Ellenburger in drilling to 5505 ft, and is to be plugged back to 5300-ft level to run pipe for completion try in Simpson. It entered Ellenburger dolomite near 5305 ft, elevation 2348 ft, and the shows passed up in Simpson are believed adequate to make a small oil producer. This wildcat is 4½ miles west of regular Permian production in McCamey district, which is to be explored for Ordovician production early next year with Texas Pacific Coal & Oil Company taking the initiative. Dawson 1-A established unusual structural relief for the Ordovician series, and it can be assumed that the latter is at a reasonably shallow depth in the McCamey field. Gulf's Estes 1, 3 miles west of deep production in Sand Hills field, was drilling dry lime at 5180 ft on Ellenburger objective. Magnolia's Tucker 1, northeast offset to its McKee pool discovery, logged 1590 ft of dry Simpson in drilling to 6960 ft, and will continue to Ellenburger. Simpson is ordinarily a thin zone, but has a maximum penetration of 1806 ft in Pecos County without getting through.

Gaines County: Shell's Leaverton 1 was coring at 7738 ft, seeking water level in Basal Permian before running pipe. Latest drill-stem test yielded 150 ft of oil- and gas-cut mud at 7657-98 ft. The last 1000 ft of formation showed oil saturation of varying degrees at close intervals, and numerous drill-stem tests recovered oil- and gas-cut mud without water. Somewhat similar condition was encountered by the two deep producers in nearby Wasson field. Stanolind, largest producer in Cedar Lake field, is to undertake an Ordovician test, being first for the structure.

Failures: Roy Lee, trustee for H. L. Hunt, recorded two failures in Borden County and one near the Ector-Midland County line, thereby terminating the group's exploratory work in the district for the time being.

WEST TEXAS FIELD COMPLETIONS

Andrews County—Embar-Ellenburger: Phillips' University-Andrews 31, c se sw sec 30, blk 10, elev 3246 ft, top Clear Fork 5410 ft, Ellenburger 7690 ft, flow 576 bbls ¼-in, natural, perf 7775-7800 and 7840-55 ft, td 7865 ft.

Andrews County—West Andrews: Phillips' University-Andrews 17, c se sw sec 1, blk 11, flow 46 bbls, 3/16-in, 4212-4355 ft.

Cochran County—Slaughter: Jerry Hawkins et al's Mallet 2-A, 580 ft out nwc lab 25, leag 47, Edwards CSL, flow 917 bbls cas, acid 11,500 gals, 4930-75 ft.

Jerry Hawkins et al's Mallet 4-A, 580 ft out sec lab 25, leag 47, Edwards CSL, flow 999 bbls cas, acid 11,500 gals, 4931-88 ft.

Magnolia's Mallet 16-C, 440 ft from nwc lab 1, leag 53, Oldham CSL, pump 183 bbls, plus 3.4 percent bs&w, acid 10,500 gals, 5025-60 ft.

Crockett County — Soma-Noelke: A. J. Rife-Floyd Scott's Thompson 3, 1547 ft from s and 1727 ft from e lines sec 58, blk GG, T.C. Ry.-B. Ingram sur, elev 2768 ft, abnd 2177 ft.

Hockley County — Slaughter: Magnolia's Mallet 17-D, 580 ft out nec lab 9, leag 49,

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Edwards CSL, flow 887 bbls, 3-in, acid 10,500 gals 4940-95 ft.

Pecos County—Taylor-Link: Milton Unger et al's University-Shell 5-A, sw nw nw sec 33, blk 16, flow 106 bbls, ½-in, shot 50 qts 1408-37 ft.

Pecos County—Abell: Humble's Parker 1, c n¼ of n¼ H&TC 6, blk 3, elev 2399 ft, top McKee sand 5330 ft, flow 1244 bbls, ½-in, natural, perf 5371-91 ft, td 5410 ft.

Pecos County—Walker: Cardinal Oil Co.'s University 3-E, 1036 ft from s and 945 ft from w lines sec 13, blk 16, flow 39 bbls, 1-in, shot 60 qts 1847-59 ft, td 1873 ft.

Childress Roy. Co.'s White-Baker 1-C, 330 ft out nwc n½ ne GC&SF 89, blk 194, elev 2866 ft, abnd sul w 2129-36 ft.

Jas. L. Cooper et al's University-Humble 2, sw se se sec 13, blk 16, flow 93 bbls, ⅛-in, shot 100 qts 2118-38 ft.

Pecos County—Tobarg: Stanolind's Tobarg 7, 700 ft from e and 1030 ft from s lines sec 539, abnd 450 ft.

Reagan County—Barnhart: Amerada's University 1-R-H, 2086 ft from e and 679 ft from n lines sec 7, blk 48, Ellenburger 9105 ft, flow 1464 bbls, ½-in, perf 9105-94 ft, td 9300 ft.

Amerada's University 1-R-I, near c nw nw sec 7, blk 48, flow 1344 bbls ½-in, acid 5000 gals, perf 9175-9230 ft, td 9287 ft.

Ward County—Spencer: Stanolind's Standard of Texas 3, 664 ft from ne and 1995 ft from se lines H&TC 68, blk 34, elev 2640 ft, abnd in sul w 2943-75 ft.

Yoakum County—Wasson: Drilling & Exploration, Inc.'s Davis-Humble 2-A, c sw se sec 728, flow 370 bbls, ½-in, acid 9000 gals 4930-5235 ft.

Drilling & Exploration, Inc.'s Knight-Shell 2-A, c ne nw sec 773, flow 304 bbls, 9/16-in, acid 9000 gals 5000-5235 ft.

WEST TEXAS WILDCAT COMPLETIONS

Borden County—Failures: Roy Lee, Tr.'s Gray 1, c sw sw H&TC 275, blk 97, elev 2447 ft, anhydrite 820 ft, Yates grains 1370 ft, San Andres 2440 ft, abnd 3214 ft.

Roy Lee, Tr.'s Phillips 1, c sw ne T&P 15, blk 32, T-3-N, elev 2501 ft, anhydrite 1120 ft, Yates 1720 ft, brown lime 2820 ft, San Andres 3040 ft, abnd 4220 ft.

Ector County—Failure: Roy Lee, Tr.'s Peck 1, c sw sw T&P 2, blk 42, T-4-S, elev 2910 ft, top Yates sand 3080 ft, solid lime 4650 ft, abnd in sul w 4812-23 ft.

WEST TEXAS WILDCAT STARTS

Andrews County: DeKalb Agricultural Assn's Means-Tidal 1, c sw sw PSL 13, blk A-45, lcn 5000-ft test.

Hockley County: Jerry C. Hawkins et al's Mallet 14-B, 580 ft out sec lab 23, leag 46, Edwards CSL sur, lcn.

Presidio County: Presidio Pet. Co.'s (was H. D. Wilcox et al's) Conring 1, 1189 ft from w and 500 ft from n lines GH&SA 102, blk 4, elev 4497 ft, co at 1040 ft to deepen to 4500 ft.

North Texas

Jack County Wildcat Has Oil Show in Strawn

Jack County: Hanlon & Buchanan's Hensley 1-A, 8 miles southeast of Jacksboro encountered oil saturation in Strawn sand at 3944-58 ft, but failed to indicate production on drill-stem test, and was drilling shale at 4360 ft toward Ellenburger objective. Shell's Henderson 1, southeast outpost for Antelope pool, failed to maintain steady flow when tested in upper pay at 3187-97 ft, and will install pump.

Clay County: Bridwell Oil Co.'s Halsell 4-B, southeast extension for Halsell pool, is setting pump after showing for a 20 to 30-bbl producer from Bend at 4730-47 ft. Youngblood & Foree's Sanzenbacher-Gulf 1, 5 miles east by north of Halsell pool, made additional perforations in Basal Bend at 5941-91 ft, and is testing. Previously it showed for 10-15 bbls daily from Mississippi perforations at 5994-6096 ft. Continental's Spring 6, 1¾ miles northwest of the Spring 5600-ft Bend pool, was making drill-stem test of broken oil saturation at 6237-62 ft in Simpson, topped at 6142 ft. Roy Lee, trustee's Maddox-Shell 1, offset to Shell's 5700-ft junked wildcat that logged oil saturation in Ellenburger, topped at 5543 ft, was drilling dry Bend lime at 5450 ft.

NORTH TEXAS FIELD COMPLETIONS

Archer County: Staley Oil Co.'s Andrews 2, 1521 ft from s and 330 ft from m/e/w lines of R. R. Rainey sur A-354, abnd 1050 ft.

R. E. Hansen et al's McAnally 2, 330 ft out SWc se blk 13, Meade Pasture subdiv, pump 4 bbls, sand 1462-67 ft.

White & Duncan's Richardson 8, 330 ft out NEc Juana Hensley sur, pump 16 bbls, sand 12-17-22 ft.

Clay County—Ross: Continental and Unit Members' Ross 10, 1371 ft from s and 481 ft from w lines sec 31, Wm. Walker sur, flow 66 bbls, 1364-in, acid 4000 gals 5390-5424 ft, td 5493 ft.

Clay County: Sussex Oil Corp.'s Glasgow 33, 165 ft from se and 330 ft from sw lines blk 34, Bacon subdiv, abnd 1263 ft.

Throckmorton County: F. G. Lippitt et al's Kelly 4, SWc sec 29, Comanche Reserve, abnd 746 ft.

A. R. Matthews et al's Brockman 2, sec 94, Comanche Reserve, pump 18 bbls, sand 711-17 ft.

R. E. Sweeney & R. Hays' Herron 1, 330 ft out NEc w½ nw TE&L 1607, abnd 743 ft.

Wichita County: Akin-Dimock et al's Hardin 8, O. Farrish sur A-383, pump 9 bbls, 535-46 ft, td 1438 ft.

Wilbarger County—Harrold: R. H. Dearing & Sons' Cochran 1, 2600 ft from s and 330 ft from w lines H&TC 47, blk 13, flow 826 bbls ¾-in, acid 1000 gals, perf 3292-98 ft, td 3323 ft.

Young County — Padgitt: Roy Lee, Tr's Vardy 1, 467 ft out NWc TE&L 350, Bend 4303 ft, Mississippi 4945 ft, abnd 5015 ft.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County—Failure: W. H. Peckham et al's DeMoss 1, 1510 ft from n and 781 ft from w lines sec 18, blk 5, Clark-Plumb sur, abnd 1120 ft.

Montague County—Discovery: Continental's J. A. Ketchum 1, 330 ft from nw and 990 ft from sw lines Hill CSL Sec 43, 2 mi e Bowie, elev 1116 ft, top Bend 6084 ft, Viola 6752 ft, Simpson 6900 ft, dolomite 7163 ft, Ellenburger 7418 ft, pump 36 bbls oil and 36 bbls water, natural, Strawn sand 3330-36 ft, td 7506 ft.

Wise County—Discovery: Stanolind's Dovie Menasco 1, 707 ft from e and 669 ft from s lines Falls CSL Sec 9, 1½ mi nw Park Springs, elev 975 ft, top Palo Pinto 1462 ft, Bend 5574 ft, conglomerate 5691 ft, Barnett 6578 ft, Simpson 6813 ft, dolomite 6890 ft, Ellenburger 7015 ft, pump 92 bbls 38.8 gr oil, plus 2½ percent water, Bend perf 5790-5818 ft, td 7310 ft.

NORTH TEXAS WILDCAT STARTS

Jack County: Hanlon-Buchanan & Johnson's Stinehouse 1, 330 ft from s and 1650 from w lines of 168.96 ac tr, SA&AMG A-589, lcn 2400-ft test.

Paul H. Gunther et al's Bailey 1, 2235 ft from w and 4083 ft from n lines Geo. H. Duncan sur A-175, ¾-mi e Gibtown, lcn 6000-ft test.

TEXAS PANHANDLE FIELD COMPLETIONS

Carson County: Cities Service's Deahl 10, H&GN 17, blk 8, 51,300,000 gas, lime 2795-2848 ft.

Skelly's Schafer 163, I&GN 197, blk 3, pump 63 bbls, shot 427 qts 3058-3140 ft.

Skelly's Schafer 164, I&GN 197, blk 3, pump 217 bbls, shot 420 qts 3060-3140 ft.

Gray County: Warner Oil Co.'s Taylor 4, sec 8, blk H, pump 60 bbls oil, 16 water, 2982-3002 ft.

Hutchinson County: Continental's Sanford 8-C, H&TC 79, blk 46, pump 280 bbls, acid 1000 gals, td 2790 ft.

J. E. Crosbie, Inc.'s, Pitts 51, TC 9, blk M-21, pump 173 bbls, shot 420 qts 2723-2810 ft.

J. E. Crosbie, Inc.'s, Pitts 54, TC 9, blk M-21, pump 181 bbls, shot 480 qts 2770-2870 ft.

WEST CENTRAL TEXAS FIELD COMPLETIONS

Brown County—Crownover: Guyle Greynolds et al's Waldrop 1, nw se sw BBB&C 26, abnd 1252 ft.

Palo Pinto County: T. P. Coal & Oil Co.'s Fee 3-X, 2593 ft from e and 5894 ft from s lines Thos. Court sur A-118, 2,433,000 gas, 600 lbs rp, shot 20 qts 3031-45 ft, td 3082 ft.

WEST CENTRAL TEXAS WATER DISPOSAL

Shackelford County — Ivy Pool: Humble's McGown 1-SW, acid 1000 gals 685-96 ft, td 1480 ft, pb to 842 ft.

WEST CENTRAL TEXAS WATER FLOODING

Callahan County: Dean Bros. et al's Isenhower 3-T, 150 ft from n and 400 ft from w lines lse, BOA 7, sand 461-69 ft, td 471 ft.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Callahan County—Failure: A. S. Goodloe et al's Braeshear 1, ne ne ne Lavaca CSL 10, abnd 824 ft.

Jones County—Failure: G. E. Kadane & Sons' Wiley 1, 330 ft from e and 900 ft from s lines T&P 2, blk 15, elev 1597 ft, abnd 2212 ft.

WEST CENTRAL TEXAS WILDCAT START

Shackelford County: I. R. McKee et al's W. F. Tucker 1, 660 ft from nw and 1822 ft from sw lines TE&L 553, lcn.

East Texas

Wood County Strike Gets Two Offsets

Two offsets assigned to recent Paluxy strike in Wood County. Smackover lime project in Ellis County hits igneous rock. Nacogdoches County deep test to run pipe to try for completion.

Quitman Pool: Shell has authorized north and south offsets to Delta and Benton's discovery on the Goldsmith tract, but will drill the north offset first. Production of the discovery is being trucked to Gulf Refining Co.'s booster station near Winnsboro, and the latter will pay $1.25 per barrel delivered into its tanks. This 43-gravity oil is reported to be mixed base, with only .9 percent sulphur content.

Ellis County: J. B. Stoddard et al's Smith-Texaco 1, mile west of Alma, was halted in hard schist at 5015 ft without reaching its Smackover lime objective. Top of Travis Peak was called at 4450 ft, elevation 480 ft.

Dallas County: J. F. Lucey and Allen Guiberson have announced plans for a Smackover lime project in southeast corner of county, near Ellis County line, on acreage farmed out by The Texas Company. Projected 6500-ft test will be in west corner of L. W. Allen 62⅓ tract, Thomas Johnson Survey.

Nacogdoches County: Texas Co.'s Strahan 1, M. J. Ariola Survey, 7 miles northeast of Nacogdoches, was halted at 9295 ft to run electric survey before landing pipe to try for completion in Travis Peak, topped at 8615 ft, elevation 447 ft. This wildcat showed probable gas production at 8640-55 ft, and additional shows were logged at intervals to 9295 ft. Four unsuccessful attempts were made to complete drill-stem test at 8900-9015 ft.

EAST TEXAS FIELD COMPLETIONS

Smith County—Chapel Hill: Sinclair Prairie's Brooks 2, 2326 ft from n and 527 ft from e lines 76.17-ac lse, J. Slayden sur, elev 455 ft, Pettit 8153 ft, flow 172 bbls ¼-in, acid 9000 gals, perf 8182-8230 ft, td 8415 ft.

Wood County—Coke: Amerada's McCrary 1, 3250 ft from s and 467 ft from e lines M. Y'Barbo sur, elev 504 ft, top Paluxy 6298 ft, flow 738 bbls ½-in, perf 6306-49 ft, td 6354 ft.

Wood County—Hawkins: Humble's Atkins 2, 775 ft n and 40 ft w of NEc Watson sur, but in J. P. Mosely sur, flow 416 bbls ¼-in, natural, Woodbine perf 4704-10 and 4802-07 ft, td 4865 ft.

Humble's J. C. Snow 3, 1465 ft s and 467 ft e of NWc J. B. Crain sur, flow 308 bbls ¼-in, perf opposite Woodbine 4666-4897 ft.

EAST TEXAS WILDCAT COMPLETIONS

Morris County—Failure: Bert Fields et al's Pewitt 1, 1775 ft from s and 1105 ft from e lines BBB&C Ry sur, elev 298 ft, Pecan 1720-2405 ft, top Woodbine 3295 ft, top Georgetown 3890 ft, Goodland 4696-4722 ft, top Paluxy 4732 ft, abnd 5027 ft.

Southwest Texas

New Sands Opened at South Caesar and Mayo

Wells completing in new sands at South Caesar and Mayor fields. Potential gauge made on Agua Dulce extension.

Bee County: Atlantic and Southwood Oil Co. are opening production in Luling sand at South Caesar with Grissom 1 flowing 116 bbls daily through 5/32-in choke from perforations at 6606-10 ft. The well showed a gas-oil ratio of 755/1, no water. Sand was topped at

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6604 ft, total depth 6625 ft. This producer is northwest of production in Slick sand, and is in P. B. McEarly survey.

Jackson County: Lonnie Glasscock is completing Heard 1, northeast outpost at Mayo, in a new pay in Marginulina section through perforations at 5126-38 ft above the 5400-ft Frio discovery pay. Although potential gauge has not been run, operator recovered 7 stands oil and oil-cut mud in 12-minute drill-stem test. Several wells have made drill-stem tests in this sand section but Glasscock is first operator to complete in the higher sand. The well is in south corner of northwest 202-acre tract, James Cummings survey 13. Total depth is 5650 ft with 7-in casing set to 5199 ft.

Dual Completion: John B. Coffee is preparing to make dual completion on Mauritz Bros. 3-B, West Mauritz, Jackson County. First perforations were made at 5596-98 ft, flowing gas and small amount of distillate through 5/32-in choke. Another sand was encountered in the 5400-ft section, which is due to be tested. Hole is bottomed at 5850 ft with casing set to 5675 ft.

LOWER TEXAS COAST FIELD COMPLETIONS

Bee County—South Caesar: Luling Oil & Gas Co.'s Slick 6, 1100 ft fr sel & 1420 ft fr nel 552-ac tr, W. F. Hodge sur A-175, 5½-in 6620 ft, perf 6616-19 ft, 240 bbls 5/32-in, td 6620 ft.

Seaboard Oil Co.'s Slick 1, 523 ft fr s&wl's of block 36, 118-ac lse, sw cor E. Stapp sur, A-293, 5½-in 6585 ft, perf 6578-82 ft, 165 bbls, 1/8-in, td 6585 ft.

Bee County—Cadiz: H. F. Wilcox Oil & Gas Co.'s Harris 2660 ft fr s&el's sec 12, 541-ac lse, Cayetano Rivas gr, 5½-in 3957 ft, perf 3760-63 ft, gas, no gauge, td 4475 ft.

Jackson County — Stewart: W. Stewart Boyle's Simmons 1, 660 ft fr n&wl's 160-ac lse, George Sutherland sur, A-75, abnd 1010 ft.

Jim Wells County—Ben Bolt: Bridwell Oil Co.'s Hoffman 1-N, 1326 ft fr el & 1477 ft fr nl 400-ac lse, LaTrinidad gr, 5½-in 5392 ft, perf 5354-62 ft, flow 5,500,000 gas and spray dist, 5/8-in, td 5862 ft.

Jim Wells County — Seeligson: Magnolia's Seeligson 33, 660 ft fr el & 4620 ft fr sl Los Jaboncillos gr, 20,887-ac lse, 7-in 5950 ft, perf 5902-08 ft, 152 bbls, 7/64-in, td 5950 ft.

Shell's Seeligson 16, 685 ft fr w'ly wl & 1900 ft fr nl of 990-ac tr, Willis Millican sur 335, A-291, perf 5943-65 ft, 152 bbls 7/64-in chk, td 6016 ft.

LOWER TEXAS COAST WILDCAT STARTS

Calhoun County: Continental's Austin 3-A, Seadrift (Powderhorn) area, 2310 ft s & 1650 ft e fr nw cor sec 5, blk J, Juan Cano Lge, lcn 6000-ft test.

Jackson County: H. Merlyn Christie's Gurinsky 1, 3 mi nw West Ranch, 692 ft fr ne & swl & 660 ft fr nwl of ne 76-ac of sw 233-ac tr of se 313-ac tr, Ramon Musquez gr, lcn 6000-ft test.

SOUTHWEST TEXAS FIELD COMPLETIONS

LaSalle County — Washburn: Quintana's South Texas Syndicate 16, 2915 ft fr n'ly sl & 4347 ft fr w'ly wl of 15,000-ac lse, T. W. House sur 113, abnd 5813 ft.

Starr County—Rincon: Humble's San Antonio Loan and Trust 4, 660 ft fr s'ly nl & 550 ft fr el CCSD&RGNG 504, 644-ac lse, abnd 4366 ft.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

Jim Hogg County—Failure: W. H. Holland's Hellen 1, blk 15, Ygnacio Mora sur 24, 19 mi sw Hebbronville, abnd 3010 ft.

McMullen County — Failure: Quintana's South Texas Syndicate 4-C, Green Branch area, ne cor nw se BS&F A-25, abnd 7140 ft.

Starr County—Failure: Sun's Gonzalez 1, 660 ft fr wl & 1980 ft fr sl F. Gonzales sur 370, 1369-ac tr, abnd 4123 ft.

SOUTHWEST TEXAS WILDCAT STARTS

Starr County: Baldridge & King's Saenz 1, 660 ft fr n&wl of 237-ac lse, sur 919, lcn 6000-ft test.

Starr County: D. C. DeWitt's Guerra 1, 660 ft fr ne&nwl 40-ac tr, blk 22, Dan L. Clark's subdvn, Jose Salinas ranch, lcn.

Starr County: Magnolia's Hinjosa 3, 3300 ft fr n & 3100 ft fr el 4579-ac lse, porc 110, S. de la Garza Hrs, lcn 5000-ft test.

SOUTH CENTRAL TEXAS WILDCAT COMPLETIONS

Caldwell County—Failure: John A. Deering's Union Central 1, Lockhart area, 918 ft ne alg se'ly sel of 222-ac lse, 40-ac unit, Esther Berry sur, abnd 2401 ft.

Milam County—Failure: George B. Buescher's Coffield 1, 12 mi s Rockdale, I&GN blk, H. Martin sur, abnd 6181 ft.

SOUTH CENTRAL TEXAS WILDCAT START

Wilson County: Rowen & Hope's Sanders 1, 101-ac tr, F. Herrera sur, lcn 1200-ft test.

Texas Gulf Coast

Reinstated Wildcat Opens New Field

New field opened in Buckeye area, Matagorda County. Production opened on north flank Boling dome.

Discovery: United North and South Development Co. has opened a new field south of Buckeye, Matagorda County, with completion of Stoddard 7, wildcat that was abandoned three weeks ago, reinstated on the active list, drilled deeper and completed as a discovery. Although details have not been released, the well flowed 243 barrels daily through 12/64-in choke after drilling to 8598 ft and setting 5½-in flow pipe to 8160 ft. While completing the well showed 500 pounds pressure on tubing, 600 pounds on casing with gas-oil ratio of 234/1. Gravity is 36.6. The well, located in G. B. M. Cotton survey, was abandoned at 8107 ft, then drilled deeper to complete.

Second location has been made 1376 ft southeast of the producer. It is R. A. Wendt et al 1. It is projected to 8600 ft with drilling to start immediately.

Wharton County: Pan American has opened production on north flank of Boling dome, although operators have had trouble in completing the well. The well is Vineyard 1 in Austin One-Third League. Perforations were made at 3724-30 ft and flowed for several hours, making 34 barrels in 4 hours through ¼-in choke. Operators have been swabbing the hole to induce flow after running into sanding-up trouble. Total depth is 4012 ft with 7-in pipe set to 3769 ft.

Brazoria County: Humble is drilling below 13,250 ft in Houston Farms 1, wildcat in Hall's Bayou area, reportedly using very heavy drilling mud. This test is scheduled to drill to 14,000 ft, and if that objective is reached it will be deepest test in Texas. It is located in Perry & Austin survey, A-109.

TEXAS GULF COAST FIELD COMPLETIONS

Jefferson County—Spindletop: Stanolind's Gladys City 106, 71-ac tr, John A. Veatch sur, n flank, abnd 5891 ft.

Matagorda County — Lucky: Stanolind's Huebner 3, 4621 ft s of nl & 2704 ft nw of most w'ly se cor 2100-ac tr, Elisha Hall sur, abnd 8950 ft.

Brazoria County — Danbury: Humble's Blakely 1-C, 660 ft e of wl & 660 ft se of nwl of 262-ac lse, HTB 14, set liner 6867 ft, perf 6513-30 ft, abnd 7875 ft.

Chambers County—Oyster Bayou: Sun's Middleton 3, 695 ft fr e & 1545 ft fr nl of TNO 122, 656-ac tr, 6-in 8550 ft, perf 8330-60 ft, 172 bbls, ⅛-in, td 8550 ft.

TEXAS GULF COAST WILDCAT COMPLETIONS

Austin County—Discovery: Ohio Oil Co.'s Kaechely 1, 250-ac tr, Vital Flores Lge, 5½-in 9411 ft, perf 9052-67 ft, 9080-9145 ft, flow 105 bbls 44.3-gr dist, 8,757,000 gas thru various chokes, tp 1500, cp 2350, td 10,104 ft. Opens Orange Hill field.

Fort Bend County—Failure: Gulf's Ehlert 1-B, Needville area, 675 ft ne alg nwl lse fr w cor & 660 ft se at ra in F. Forester sur, A-470, 7-in liner 9143 ft, abnd 11,132 ft.

TEXAS GULF COAST WILDCAT STARTS

Harris County: Shell's Peden 1, Willow Spring area, 3687 ft fr n & 660 ft fr el of John Brock sur, 2000-ac tr, lcn 10,500-ft Wilcox test.

Wharton County: Magnolia's Kountze-Stewart 1, s Hillje field, 160-ac tr, BS&F 10, lcn 8500-ft Frio-Vicksburg test.

Louisiana Gulf Coast

Shallow Sand Opened In Miocene at Whitelake

New sand opened at Whitelake, Vermilion Parish. Bayou Sale field extended westward into East Cote Blanche Bay.

Vermilion Parish: Union Oil Co. has opened a new shallow sand at Whitelake with Louisiana Furs 6-A, 15-15s-1e, flowing 8½ bbls hourly through perforations at 6808-13 ft in upper Miocene through 532-in choke. The well showed a gas-oil ration of 700-1, the oil being 36.9 gravity. Total depth is 8561 ft with casing set to 6878 ft. The field has several other sands, all at a lower level.

St. Mary Parish: The Bayou Sale field has been extended westward with Texas Co. completing State-East Cote Blanche Bay 2 for 171 bbls through 1/8-in choke. Perforations were made at 10,122-74 ft. Operators found sand at 10,107-63 ft, topping best saturated section at 10,121 ft. Previous to completion, however, a squeeze job was made at 10,138-43 ft to shut off water. The well is located in the bay.

Humble is drilling a well on east side of field, depth now being around 8356 ft in shale.

SOUTH LOUISIANA FIELD COMPLETIONS

Evangeline Parish—Pine Prairie: C. & I. Production's Haas 1, 1669 ft s, 331 w nec 2-4s-1w, 5½-in 9076 ft, perf 8906-18 ft, 149 bbls, ¼-in, td 9149 ft, opens Sparta production on southeast flank.

St. Charles Parish—Bayou Couba: Gulf's Delta Securities 2, 760 ft s alg el of sec 13 fr ne cor & 1980 ft w at ra in 13-15s-21e, 5½-in 6449 ft, abnd 6449 ft.

St. Charles Parish—Lake Salvador: Texas Co.'s State-Lake Salvador 19, lse 19, n 43 deg 46 mins w 20,746 ft fr USCGS mon "In" in Lake T-16s-22e, set 7-in 9660 ft, perf 9556-68 ft, 196 bbls, ¼-in, td 10,254 ft.

St. Mary Parish—Bayou Sale: Texas Co.'s State-East Cote Blanche Bay 2, lse 240, s 35 deg 24 mins w 7351 ft fr USCGS Mon "South Bend" in Bay T-16s-9e, 7-in 10,157 ft, perf 10,122-134 ft, 171 bbls, ¼-in, td 10,163 ft.

Terrebonne Parish—Lake Decade: Superior's Laterre Land 2, 7620 ft n 00 deg 47 mins 27 sec w, 4625 n 89 deg 12 mins 33 secs e fr se cor sec 32 in sec 28-19s-15e, abnd 13,075 ft.

SOUTH LOUISIANA WILDCAT COMPLETION

Vermilion Parish—Discovery: Union Oil Co.'s Louisiana Furs 1-C, Fresh water Bayou area, 16,394 ft s, 14,544 e of se cor T-15s-12 in se nw 33-16s-2e, 5½-in 11,692 ft, perf five sands below 9950 ft, completed gas-distillate well, no gauge, shut in, td 11,985 ft.

North Louisiana

Bossier Parish Discovery Shut in Waiting Pump

Bear Creek test makes prolific gas flow. Bienville Parish wildcat to test. Bossier Parish discovery shut in, two offsets drilling.

Bienville Parish: H. L. Hunt's Hodge-Hunt Southern Advance A-1, C SE NW 11-16n-6w, is making estimated 50,000,000 ft of gas per day from Pettit lime. This producer is one of six wells in the Bear Creek field acquired by Southern Natural Gas from Hunt, who has been the principal developer of the area.

Southwest of Bear Creek production Placid Oil Co.'s Nebo A-1, C SW NE 11-15n-7w, is below 6551 ft.

Bossier Parish: Gas pressure at H.

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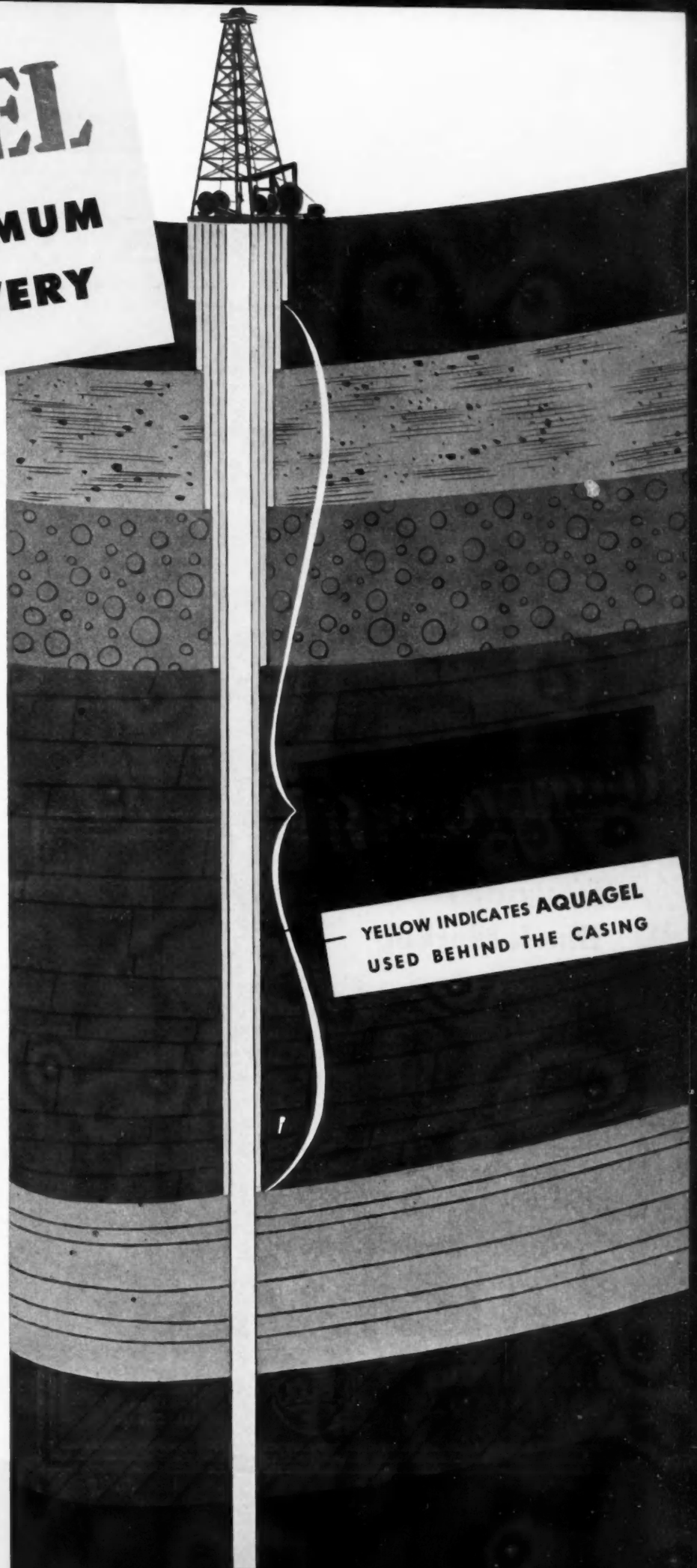

AQUAGEL by preventing caving, lubricating the formation, shutting off excessive water flows (all of which prevent freezing of the casing), enables almost 100% recovery of intermediate strings in cable tool operations. As an example, in one field alone where 40 wells were drilled, using AQUAGEL, 39 had complete casing recovery. This is many times greater recovery than when AQUAGEL is not used. Inasmuch as 39.6% of all the wells in the United States during 1941 were drilled with cable tools, the extra casing which could have been recovered, had AQUAGEL been used, would amount to many thousands of tons. In addition, less than half the time is consumed in pulling casing, corrosion is materially reduced and the life of drilling line is prolonged when AQUAGEL is used. These same benefits often apply in rotary drilling.

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L. Hunt's Nebo 1, C SW SE 3-23n-12w, Pettit lime discovery well, less than one mile from Louisiana-Arkansas state line, was not available when gas lift and flow valves were installed to raise fluid in hole enough to make official gauge. Operators have the discovery well closed in prepartory to installing standard rig. The company has two offset tests drilling.

Approximately six miles southwest of the old Carterville field, British-American's wildcat, Blocker 1, 1-22n-13w, is drilling in shale below 2250 ft.

NORTH LOUISIANA FIELD COMPLETIONS

Bossier Parish — Sligo: Triangle Drilling Co.'s Murph B-3, c nw se 24-17n-12w, pump 40 bbls, 3186 ft.

Triangle Drilling Co.'s Murph B-4, c ne se 19-17n-11w, pump 50 bbls, 3188 ft.

Bossier Parish—Bellevue: Premier Investment Co.'s Wurtsbaugh 1, 22-19n-11w, flow 3,000,000 gas, 3900 ft.

Caddo Parish—Caddo: Bayou State's Brown 51, 27-20n-16w, abnd 1195 ft.

Claiborne Parish — Haynesville: Robert Stacy's Smith 1, s½ sw sw 4-23n-8w, flow 100 bbls, 3 hrs, perf 5494-5504 ft, td 5550 ft.

Robert Stacy's Hudson-Sales 1, 25-23n-8w, flow 325 bbls, 15 hrs, ½-in, tp 200, 4000 gals acid, perf 5402-10, 5412-20 ft, td 5505 ft.

NORTH LOUISIANA WILDCAT COMPLETIONS

DeSoto Parish: Youree's Francis T. O'Neal 1, c nw ne 23-12n-15w, perf 2710-59, 50 bbls, 33-gr, td 2759 ft (to deepen).

Red River Parish — Failure: Cryer and Reese's Biles 1, c sw se 25-12n-9w, abnd 2500 ft.

NORTH LOUISIANA WILDCAT STARTS

Caddo Parish: Harris & Owen's Fuller 1, c se ne 4-22n-15w, mlm.

Bossier Parish: Hunt's Nebo Oil Co. 2, c sw sw 3-12n-23w, dr.

Hunt's J. F. Ogle 1, c ne ne 10-23n-12w, dr.

Red River Parish: O'Meara's Franklin Realty Co. 1, ne sw 24-11n-10w, mlm.

Union Parish: Hunt's Frost 1, c sw ne 18-23n-1e, dr.

Catahoula Parish: Hunt's Louisiana Central 1, c ne nw 19-9n-6e, dr.

Arkansas

Columbia County Well Testing Haynesville Sand

Haynesville prospect testing Pettit lime; another opens field; Columbia County, wildcat quits.

Columbia County: North of Haynesville field, in Navarro Oil Co.'s Beene 1, C SE SW 10-20s-20w, drilled to 5570 ft topped first Pettit lime, the Haynesville field producing horizon, at 5399 ft and second Pettit lime was logged at 5463 ft. Operators have set casing, perforated the section at 5463-78 ft, and tests are under way.

Roy Lee et al's Pickler 1, SW NE 23-17s-21w, field opener south of Magnolia, is making Arkansas allowable of 200 bbls per day for this discovery to be on an 80-acre tract.

Southwood Oil Co. abandoned Medlock 1, C SE NE 12-16s-19w, when a drill-stem test at 6554 ft recovered mud, salt water and oil. A drill-stem test in early test recovered 2 ft of favorable show. Smackover lime was topped at 6548 ft. Hole is bottomed at 6564 ft.

ARKANSAS WILDCAT STARTS

Bradley County: Placid's Murphy 1, c ne se 3-16s-10w, dr.

Placid's Murphy 2, c se se 28-15s-10w, Murphy 3, c sw sw 16-17s-10w, dr.

Calhoun County: Placid's Freeman-Smith 2, c nw nw 12-15s-14w, dk.

Placid's Freeman-Smith 3, ne se 14-16s-13w, sd.

Columbia County: Hunt's Pinewoods A-1, c se nw 9-20s-22w, rig.

Nevada County: Hunt's Kirk 1, c nw se 33-12s-20w, dr.

Hunt's Stamps Land 1, c nw nw 35-14s-23w, dr.

Union County: Carter's Foyil 1, c nw nw 12-19s-15w, dr.

Fohs, Pilgrim and Root's Grace 1, nw se 31-17s-14w, dr.

Mississippi

State's Deepest Test Quits at 11,902 Feet

Clarke County wildcat on the beam. Mississippi's deepest test quits in Franklin County.

Clarke County: A. B. Irion's Long-Bell 1, SW SE SW 10-2n-16e, 4 miles southeast from Quitman, is on the beam for an estimated 125 bbls per day, flowing into pits. The east Mississippi wildcat recovered 9 ft of saturation in a core from Eutaw sand logged at 3679 ft in early test. South of Irion's Long-Bell 1, same section, Macro Drilling Co.'s Long-Bell 1, recovered 5 ft of clean oil in a drill-stem test at same horizon the Irion wildcat encountered Eutaw pay level. The Macro test ran casing to try for production. Casing parted before operators could complete a cement job. The Macro hole was junked.

Franklin County: Amerada Petroleum Corp.'s Central Lumber Co. 1, C NW NE 10-7n-3e, has been abandoned with no commercial shows reported, to 11,902 ft to date, the deepest hole drilled in Mississippi.

MISSISSIPPI WILDCAT STARTS

Adams County: Pure Oil Co.'s McDowell 1, 1-6n-4w, fish.

Clarke County: Harry Elliott's Long-Bell 1, 24-4n-16e, lcn.

Claiborne County: Amerada's Roney 1, 66-11n-2w, lcn.

Sharkey County: Texas Co.'s Linzey 1, 19-13n-5w, lcn.

Hunt's Cameron 1, 6-13n-6w, dr.

Issaquena County: Frontier's Mann 1, 24-11n-8w, mlm.

Hunt's Delaney 1, 26-13n-8w, lcn.

John Allen's Stock & Walker 1, 29-13n-8w, lcn.

Madison County: Love Petroleum Co.'s Jones 1, 19-9n-1e, lcn.

Simpson County: Carter's Allison 1, 17-1n-4e, mlm.

Gulf's Wilbe 2, 5-2n-4e, sd.

California

Indicated Deep Sand In Del Valle Outpost

Deep sand discovery in Del Valle area, Los Angeles County, points to major new discovery which may usher in most extensive deep zone development campaign in state since development of deep San Joaquin Valley producing areas in 1935-1938 period. Three other wildcat tests slated for district.

Los Angeles County: Discovery of a fifth zone in the Del Valle area has been made by R. E. Havenstrite in Barnes 2, a deep test in 16-4-17, on the west flank of the Del Valle field. Well encountered a new producing horizon at 9740 ft and has been bottomed at 9875 ft preparatory to completion. Well was bottomed in streaks of sand and shale and is reported to have some 155 ft of solid coarse grained oil sand offering greater production possibilities than anything yet cored in the area.

Operator cored the top of the Sherman zone at 5850 ft, the Del Valle zone 6548-6750 ft, the third zone at 7931 ft and fourth zone at 8125 ft. Formation test on the 8125-ft zone produced at a 2000-barrel daily rate.

The theory is being advanced the new Havenstrite discovery may represent a shore-line accumulation similar to the Coalinga Nose structure in Fresno County and may be found productive over a wide area along a northwest,

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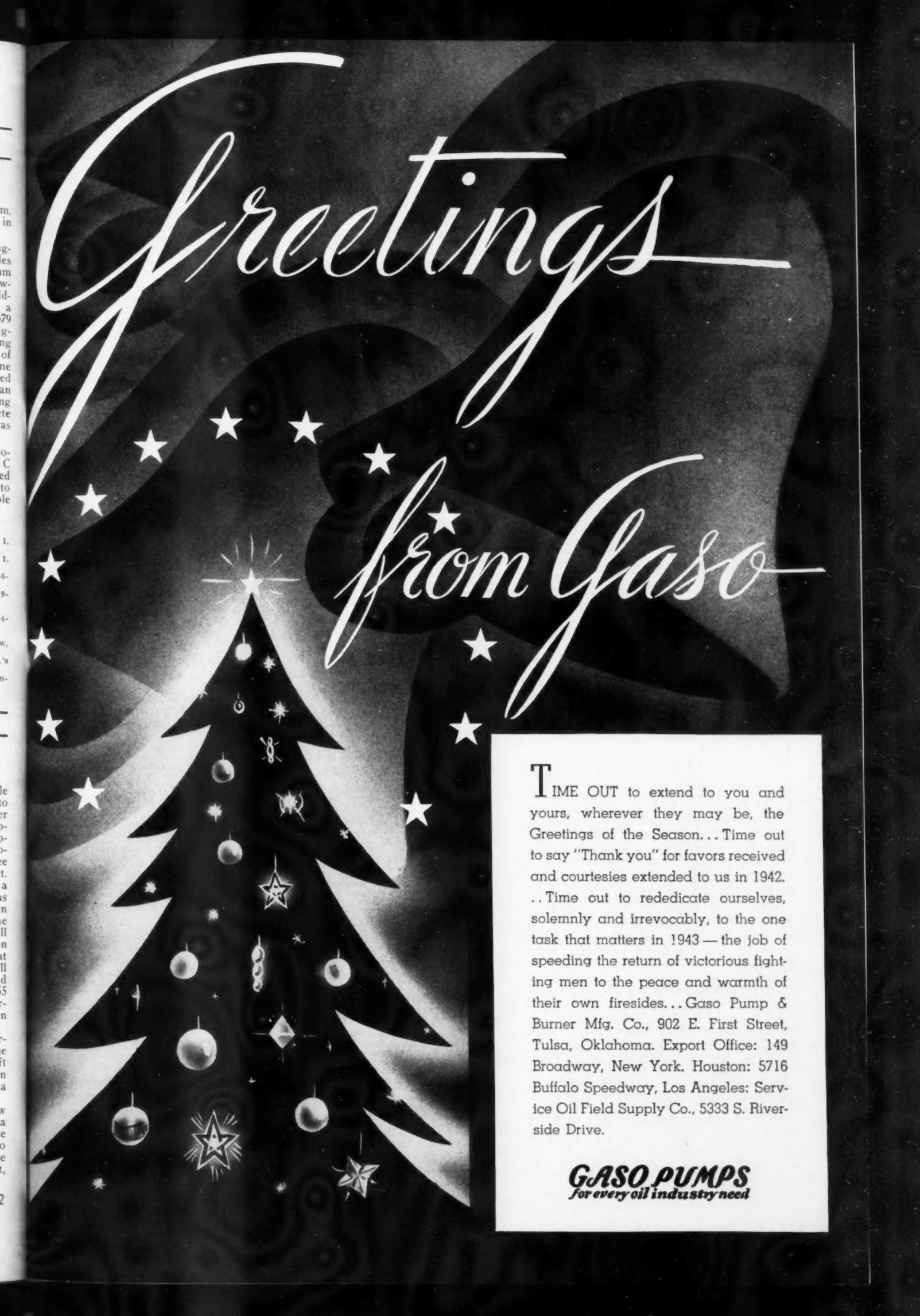

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southeast axis extending through the Newhall Potrero producing area more than 2 miles southeast and beyond.

Within the same general area three other wildcat projects have been staked. These include Foothill-Orchard 1 to be drilled by J. Paul Getty, 6-2-15, San Fernando-Granada Acres area; a test by Caloga Oil Co., not yet identified, to be drilled in 35-2-17, Canoga Park area; and M. A. Gilmour 1 to be drilled by Western Gulf Oil Co. in 32-5-17, Oak Canyon area.

Imperial County: In the Chocolate Mountains bordering the Imperial Valley in Imperial County, Irex Oil Co. has staked tentative location for a test in 5-11-16, 18 miles southeast of present carbon dioxide gas development at Salton Sea, and ½ mile southeast of a well drilled several years ago by John Barth which was credited with gas showings at 2800 ft.

Santa Barbara County: After failing to find showings in the Sespe, topped at 3285 ft, Security Land & Royalty Co. has abandoned County 1, Sec. 12-4-28, Goleta area, at 3290 ft.

In the East Gato Ridge district General has staked for Wickenden 2, a wildcat, 13-8-32.

Ventura County: Considerable leasing activity is reported in the Shiells Canyon-Bardsdale area, Barnsdall having acquired the King property and Standard the Burson Ranch. Seaboard is also reported to have acquired sizeable acreage in the district. In the Fillmore-Sespe area, Shell continues to add to its holdings, more recent acquisitions including the Felsenthal, Warring and Mosbarger ranches at Fillmore and the Ida Kellerman property at Piru.

CALIFORNIA COMPLETIONS

Fresno County—Coalinga Old Field: Shell's No. 158-15, 328 ft n, 2119 w sec 15-19-15, pump 52 bbls, perf 1383-1449, 1469-1505, 1549-1579 ft, oil sand 1405 ft, Kreyenhagen 1630 ft, td 1634 ft, pd 1580 ft.

Shell's No. 172-32, 1001 ft s, 989 w nec 32-19-15, pump 210 bbls, 140 ft perf 2927 ft, black shale 2682 ft, td 2928 ft.

Shell's No. 105-36, 328 ft s, 331 e w¼c 36-19-15, pump 58 bbls 20.8-gr, 96 ft perf 3639 ft, td 3903 ft, pd 3602 ft.

Fresno County — Jacalitos Hills: Wilshire Annex Oil Co.'s No. 47-26, 1425 ft n, 804 W s¼c 26-21-15, flow 67 bbls 40.8-gr, 13/64 in, 23 ft perf 3887 ft, td 3887 ft.

Fresno County—Riverdale: Amerada's Mathias 36-15, 990 ft s, 1650 e w¼c 15-17-19, flow, no est, perf 6840-6850, 6820-6830, 6780-6800 ft, Temblor 5517 ft, td 6900 ft.

Amerada's Lawton F-33-26, 510 ft s, 660 e center 26-17-19, flow 212 bbls 38.5-gr, 12/64-in, 1500/500 lbs; perf 6675-6685, 6655-6665, 6620-6630 ft, td 6900 ft, pd 6850 ft.

Kern County — Belridge South: Belridge's No. 26-33, 1925 ft n, 746 ft e swc 33-28-21, pump 50 bbls 14.5-gr, perf 409-750 ft, td 750 ft.

Belridge's No. 36-33, 1925 ft n, 1398 e swc 33-28-21, pump 50 bbls 14.5-gr, perf 368-670, 695-740 ft, td 750 ft.

General Belridge 22-3, 813 ft n, 1700 e w¼c 3-29-21, pump 74 bbls 14.2-gr, perf 584-816, 859-990 ft, td 1010 ft.

Kern County — Buena Vista Hills: Standard's No. 107-27B, 1365 ft n, 2270 w sec 27-31-23, pump 20 bbls 29.2-gr, 355 ft, perf 3285 ft, td 3291 ft.

Standard's No. 7-35B, 2300 ft n, 480 e swc 33-31-23, pump 12 bbls 28.2-gr, perf 3470-3428 ft, td 3490 ft.

Kern County—Kern Front: General's Young 47, 235 ft s, 760 e n¼c 14-28-27, pump 62 bbls 14.3-gr, 387 ft perf 2001 ft, td 2002 ft.

Kern County—Midway-Sunset: North American Oil Consolidated's Lockwood 54, 397 ft n, 485 w s¼c 16-32-23, pump 33 bbls 13-gr, 545 ft perf 1223 ft, td 1396 ft.

Kern County—Mount Poso: Chanslor-Canfield's Mon 16, 1260 ft s, 2719 e nwc 26-27-28, pump 96 bbls 15.7-gr, 60 ft perf 1482 ft, Vedder 1433 ft, td 1660 ft, pd 1482 ft.

Union's S & M 36; 607 ft n, 651 ft e swc 4-27-28, pump 76 bbls 15.1-gr, 70 ft perf 2016 ft, Vedder 1946, td 2016 ft.

Kern County—Round Mountain: Honolulu's No. 31, 815 ft s, 2015 e nwc 18-28-29, pump 161 bbls 14.3-gr, perf 1913-1947 ft, Vedder 1920 ft, td 1985 ft, pd 1962 ft.

Shell's Caldwell 23, 630 ft n, 1079 e swc 7-28-29, pump 286 bbls 16-gr, 19 ft perf 1741 ft, Vedder 1721 ft, td 1741 ft.

Kern County — Williams: Shell's Williams 33-6, 1616 ft s, 1758 e nwc 6-28-20, flow 309 bbls 16.5-gr, ½-in, 4010 lbs, perf 2295-2291, 2267-2210 ft, td 2315 ft.

Orange County—Huntington Beach: Southwest Exploration's State 48, 269 ft n, 4214 ft w c/l 23 & Ocean, flow, no est, 608 ft perf 5352 ft, td 5352 ft.

Santa Barbara County—Gato Ridge: Barnsdall's Tognazzini 4, 215 ft s, 850 ft e c-6, Rancho Los Alamos, 4-8-32, pump 460 bbls 12.9-gr, 1055 ft perf 3710 ft, td 3720 ft.

Santa Barbara County—Santa Maria Valley: Union's Mahoney 5, 330 ft n, 990 w s½c 24-10-34, flow 1040 bbls 15.9-gr, ½-in, 230/1160 lbs, 700 ft perf 3672 ft, td 3673 ft.

CALIFORNIA WILDCAT COMPLETIONS

Kern County Failure: Mountain View area: DiGiorgio Fruit Corp.'s No. 1, nec 12-31-29, oil stained sand 1250 ft, abnd in granite 2271 ft.

Kern County Failure — Round Mountain area: D. G. Vedder's Bell 12, 240 ft n, 660 w e¼c 12-28-28, barren Vedder 2102 ft, abnd 2882 ft.

Santa Barbara County Failure—Gato Ridge area: General's Giorgi 1, 2699 ft Wly along

The OIL WEEKLY'S TRADING POST

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■ For Sale: 11,000′ 2″ 4½-lb. used Lapweld Tubing, 6000′ ⅝x25′ used Sucker Rods. 5 100-bbl. used Steel Bolted Tanks. Located at Pioneer, Texas. Keystone Production Company, Fort Worth, Texas.

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■ The City of Newell, S. Dak., will receive sealed bids until 7:30 P.M. of December 28, 1942, for the following property: One No. D T 1210 Complete Ideco Pumper Unit; Approximately 2400 feet ¾ inch Norris Galvanized Sucker Rods; One 13-35 Variable Speed Electric Motor. Specifications may be obtained by writing G. Martin Berg, City Auditor, Newell, S. D.

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Regular classified advertisements for this special section, set in type this size without border, take flat rate of 7 cents per word for the first insertion and 5 cents per word for each subsequent insertion of same copy. Display advertisements for this section, set in suitably larger type with ruled border, are $5.00 per inch for first insertion and $4.00 per inch for subsequent insertions. Remittance must accompany copy which should be sent to:

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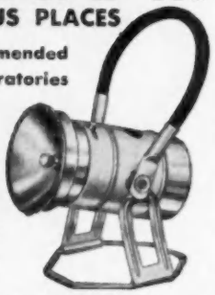

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TRADING POST SECTION

on page 70 of this issue

"USED EQUIPMENT FOR SALE"

"EQUIPMENT WANTED TO BUY"

"HELP WANTED"

"NOTICE OF PROPERTY FOR SALE"

and others that you may find of interest.

Sly line Jas. Giorgi ppty from sec thence 1876 ft Nly at R/A, 13-8-32, abnd 1255 ft in Franciscan basalt topped at 975 ft.

Ventura County Failure—Santa Paula area: J. J. Steven's Corehole 1, 800 ft n 800 ft e swc 31-4-20, abnd 1102 ft in gray sand and shale.

CALIFORNIA WILDCAT STARTS

Kern County: Union's Houchin Farms 65-34, 34-31-26, Paloma area, lcn.

Orange County: J. E. F. Oil Co.'s Larson 1, 24-4-11, Stanton area, lcn.

Santa Barbara County: General's Wickenden 1, 24-8-32, Gato Ridge area, lcn.

Tide Water's Chamberlin 1, 33-8-31, Los Olivos area, lcn.

San Luis Obispo County: R. S. Lytle's Holmes 1, 6-32-13, Edna area, rig.

Michigan

To Test Headquarters Below Sulphur Zone

Sun Oil Co. is rigging up rotary on State A-2, N½ NW SW 33-21n-3w, Roscommon County, to deepen through sulphur oil zone of Detroit River into Richfield dolomite section. State A-2, on west flank of Headquarters field was completed earlier this year as a new horizon discovery at 4970 ft. Three other wells are producing from same formation. The four wells have produced an average of 20 barrels each per day, flowing, of a high sulphur crude. This same sulphur zone has been found in at least three of the areas producing from the Richfield, about 200 feet deeper. Richfield has not been tested in the Headquarters field.

Mecosta County—Fork: Smith Petroleum's Ralph 2, s½ NW NW 8-16n-7w, Fork Township, flowed 90 bbls natural first 17 hours from Dundee at 3889 ft, marking fourth producer for new field. It is 1320 ft south of a well and 2640 ft south of the discovery.

Gladwin County—Wildcat: First deep test in old Bentley field, Sun Oil Co.'s Davis 1, C SE SE 17-17n-2e, cased in top of Richfield horizon at 4711 ft, and picked up 3000 ft of water at 4768 ft, where well was shut down for orders. Old field is producing from Dundee lime at 3450 ft.

Lake County—Wildcat: Bolger and Gordon Oil Co. surveyed location on Coveny 1, N½ NE SE 31-19n-11w, Ellsworth Township, ½ mile northeast of Ohio's Peiser 1 wildcat in 6-18n-11w, a test which carried free oil in Dundee.

Clare County—Winterfield: Pure Oil Co. is carrying hole full of water at Nearhood 1, W½ NW NW 33-20n-6w, Winterfield Township, second deep test for district. Well drilling at 4500 ft with cable tools and about 500 ft off casing point. Pure's McClain 1, Section 30, completed earlier in fall for 200 bbls in Sylvania at 5060 ft, for first deep producer in area.

MICHIGAN FIELD COMPLETIONS

Arenac County—Adams: C. W. Teater's Fox 1, ne sw nw 22-19n-3e, Dundee lime, dry, 3005 ft.

Mogul Oil Co.'s Miscisin 1, c se ne 31-19n-4e, Monroe, dry, 4210 ft.

Ervin Major's Hull 1, c se nw 27-19n-3e, Dundee lime, dry, 3043 ft.

Bay County — Kawkawlin: Chapman Oil Co.'s Dore 1, w½ nw nw 33-15n-4e, Dundee lime, 10 bbls after acid, 2955 ft.

Mecosta County — Fork: Smith Petroleum Co.'s Ralph 2, s½ nw nw 8-16n-7w, Dundee lime, flow 91 bbls 17 hrs, td 3889 ft.

Ottawa County—Zeeland: N. R. Dodd's Roeloff 1, se sw sw 32-5n-14w, Traverse lime, dry, 1505 ft.

Van Buren County—North Bangor: Harris Oil Co.'s Funk 1, sw se se 4-2s-16w, Traverse lime, pump 4 bbls, 1008 ft.

Fisher McCall Oil & Gas Co.'s Dillman 1, sw sw ne 9-2s-16w, Traverse lime, flow and pump 180 bbls oil, 20 bbls water, td 1015 ft.

Van Buren County — Bangor: James L. Drake's Fee 1, nw nw sw 28-2s-16w, Traverse, dry, 1100 ft.

MICHIGAN WILDCAT COMPLETIONS

Allegan County — Failure: J. W. Lang's Johnson 1, sw ne sw 2-2n-14w, Traverse lime 1430 ft, dry, 1441 ft.

Ionia County—Failure: Freeman Oil Co.'s Loomis 1, c sw se 17-8n-5w, North Plains township, Dundee lime 2960 ft, water 2978 ft, td 3006 ft.

Missaukee County — Norwich (New Horizon): Sun's Horner 3, s½ ne nw 14-24n-5w, Dundee lime 3074 ft, pay 3082-90 ft, acidized 500 gals, flow and swab 33 bbls, td 3096 ft.

MICHIGAN WILDCAT STARTS

Allegan County: R. B. Patrick's Stone 1, c ne nw 30-1n-12w, lcn.

Gladwin County: Bolger and Hilliard's State 1, n½ nw se 13-17n-1e, rig.

Kent County: Dapar Oil Co.'s Porter 1, se sw se 26-5n-12w, rig.

Lake County: C. W. Teater's Allen 1, e½ ne se 34-20n-13w, rig.

Osceola County: Sun's Rice 1, n½ nw ne 15-17n-8w, dr.

Union Drilling & Producing Co.'s Allen 1, s½ sw se 31-19n-9w, rig.

Roscommon County: Mogul Oil Co.'s Hartwick 1, s½ se sw 25-22n-4w, rig.

Eastern States

OHIO COMPLETIONS

Athens County: Wallace et al's Halbirt 1, 50,000 gas, 1325 ft.

H. B. Walker's Hounestine 1, abnd 1665 ft.

McBill Oil Co.'s Antle 9, 10 bbls, 453 ft.

Ohio Fuel's Sunday Creek 216, abnd 972 ft.

Fulton County: Stevens & Yasdic's Baker 1, abnd 1965 ft.

Highland County: West & Hunterlock's Cope 1, abnd 1700 ft.

Knox County: Ohio Fuel's Pinkley 1, abnd 2591 ft.

H. E. Perkins' White 2, abnd 2758 ft.

Licking County: Lacknette et al's Oatman 1, 250,000 gas, 2655 ft.

C. K. Setles Frost 7, 3 bbls, 628 ft.

Lorraine County: Ohio Fuel's Churchward 1, abnd 2735 ft.

Ohio Fuel's Archer 1, abnd 2659 ft.

Medina County: H. C. Bishop's Bellus 1, abnd 3302 ft.

Ohio Fuel's Dieckman 1, abnd 3477 ft.

Muskingum County: Atha's Persin 2, 942,000 gas, 4391 ft.

Atha Co.'s Thompson 3, abnd 3345 ft.

Ohio Fuel's Powelson 2, 425,000 gas, 4120 ft.

Ohio Fuel's Liggitt 1, abnd 4172 ft.

Wittmer's Vernon 1, 819,000 gas, 4042 ft.

Perry County: Industrial Gas Corp.'s King 1, 25,000 gas, 3360 ft.

Industrial Gas Corp.'s Hough 2, 2,000,000 gas.

Ind. Gas Corp.'s Wilson 4, 15 bbls, 3246 ft.

Tuscarawas County: Nat. Gas of W. Va.'s Camp 2, 425,000 gas, 4662 ft.

Washington County: Ohio Fuel's Miller 1, 1,150,000 gas, 3074 ft.

Burkhart's Hall 5, 80,000 gas, 1500 ft.

PENNSYLVANIA COMPLETIONS

Armstrong County: T. W. Phillips Gas & Oil's Patterson 1, 60,000 gas, 3486 ft.

Equitable Gas Co.'s Heilman 2, 133,000 gas, 1498 ft.

John Johnson & Co.'s Brown 2, abnd 1231 ft.

Washington County: South Penn Oil Co.'s Sharpnack 2, abnd 3180 ft.

WEST VIRGINIA COMPLETIONS

Boone County: United Carbon Co.'s Silver Coal & Land Co. 5, Peytonia dist, 580,000 gas, 1494 ft.

Hope Natural Gas Co.'s Hopkins 8629, Washington dist, 190,000 gas, 2483 ft.

Calhoun County: Francis E. Pettis' Cain 1, Sheridan dist, 5 bbls, 1760 ft.

Harrison County: Shinnston-Lumberport Gas Co.'s Heldreth 1, Eagle dist, gas, 6900 ft.

Jackson County: United Fuel Gas Co.'s Randolph 5124, Ripley dist, 5,955,000 gas, Oriskany 5031 ft, td 5045 ft.

United Carbon Co.'s Perkins 1066, 10,116,000 gas, Oriskany 5344-82 ft, td 5385 ft.

United Carbon Co.'s Perkins 1607, 6,250,000 gas, Oriskany 5380 ft, shot 5382-5410 ft, td 5412 ft.

Lewis County: South Penn Nat. Gas Co.'s Krenn 10, Freemans Creek dist, abnd 2146 ft.

Mingo County: Shewey Collier et al's Waldron 1, Hardee dist, 103,000 gas, 1668 ft.

Burning Creek M. & L. Co.'s Fee 2, Warfield, dist, 200,000 gas, 3108 ft.

Putnam County: Dennis M. Roy's Hall 1, Curry dist, 94,000 gas, 2330 ft.

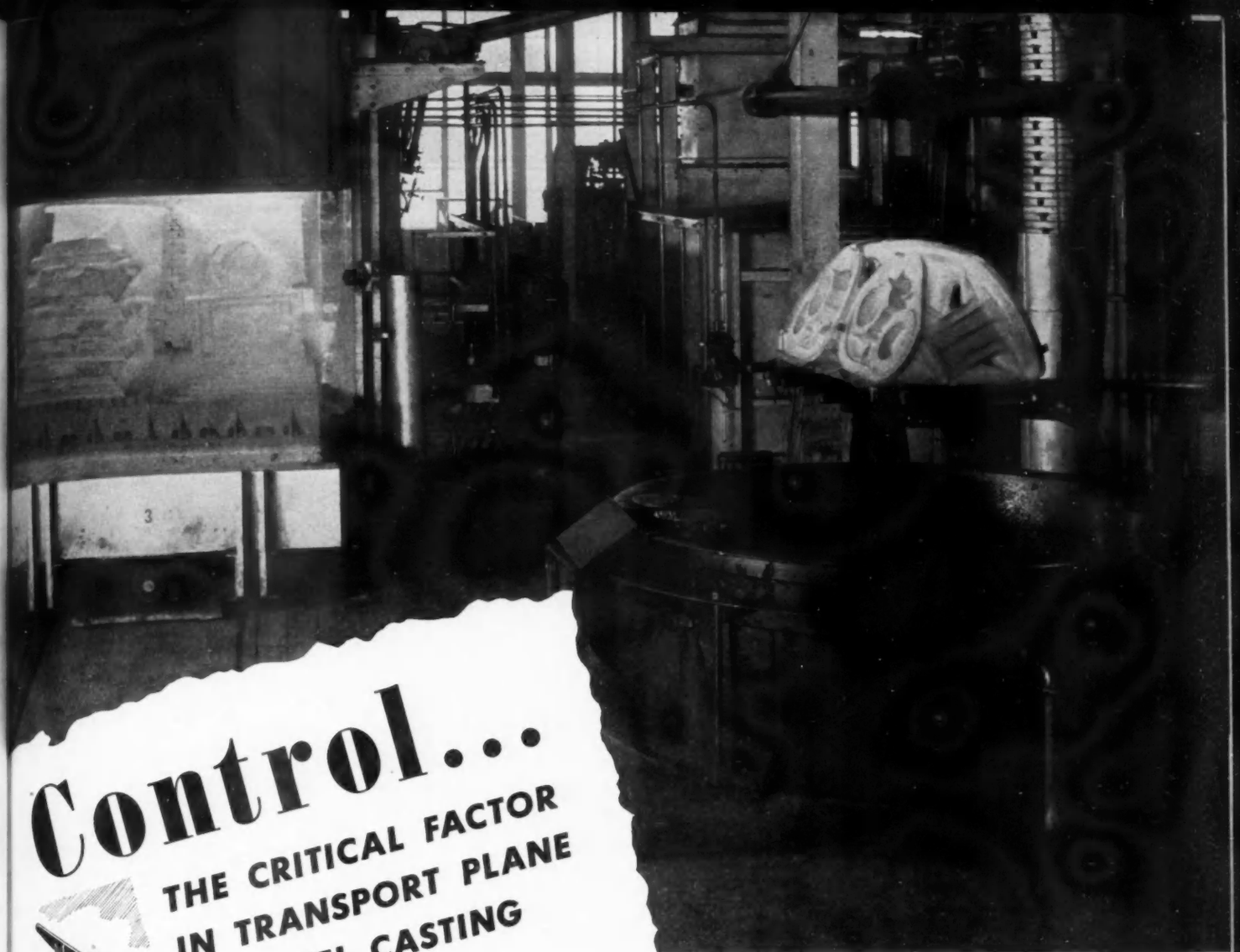
H. H. Baker's Smith 3, 94,000 gas, 2330 ft.

Midway City Gas Co.'s Switzer 7, 179,000 gas, Berea 2100 ft, td 2134 ft.

Roane County: Benedum & Trees' Criner 1, Ready dist, abnd 2700 ft.

Upshur County: Hanley & Bird's Long-Fitzgerald 1, Meade dist, abnd 3810 ft.

Cumberland & Allegheny Gas Co.'s Elmer 328, 52,000 gas, rp 485, td 4175 ft.



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Men in the Industry's News

J. C. HUNTER, president of the Mid-Continent Oil & Gas Association, George C. Gibbons, executive vice president, and Clarel B. Mapes, secretary-treasurer, were reelected at the annual meeting of the board of directors of the association at Tulsa December 17. Regional vice presidents elected include: Oklahoma, F. O. Prior, Stanolind Oil & Gas Company, Tulsa; Texas, George Sawtell, Kirby Petroleum Company, Houston; Louisiana-Arkansas, D. W. Harris, Arkansas Natural Gas Corporation, Shreveport; Kansas, Ralph Pryor, Pryor & Lockhart, Inc., Wichita, and New Mexico, Van S. Welch, Flynn, Welch and Yates, Artesia.

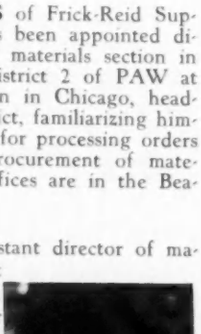
T. R. BOWLER, Sun Oil Company, Clare, Michigan; E. F. Clagett, Pure Oil Company, Saginaw; and Walker Franks, Gordon Oil Company, Mt. Pleasant, were elected new directors of the Oil and Gas Association of Michigan recently. New and re-elected directors will meet with the carry-over members later to name officers and committees for 1943.

The 12 reelected directors were C. M. Ashby, Ashby Drilling Company, Grand Haven; W. P. Clarke, Gulf Refining Company; C. W. Teater, independent, and George B. Talbot, Talbot Oil Company, Saginaw; Kurt deCousser, Socony Vacuum Oil Company, Lansing; Lee C. Lamar, Carter Oil Company, Edwart Stewart, Stewart Oil Company, and W. A. Thomas, Mt. Pleasant; S. L. McCall, Fisher-McCall, Inc., Detroit; W. B. Pardoe, Dapar Oil Company, and C. A. Smith, Jr., Smith Petroleum Company, Grand Rapids, and Don F. Rayburn, independent, Bay City.

A. M. LLOYD of Sun Oil Company, Dallas, discussed "The Jurassic of Northern Louisiana and Southern Arkansas" before the Houston Geological Society, December 17.

S. R. CLINKSCALES of Frick-Reid Supply Corporation has been appointed director in charge of materials section in the sub-office of District 2 of PAW at Tulsa. He has been in Chicago, headquarters of the district, familiarizing himself with procedure for processing orders required for the procurement of materials. The Tulsa offices are in the Beacon Building.

C. E. NAYLOR, assistant director of materials for District 3, PAW, has been appointed director for the district, offices at Houston. Naylor succeeds Frank L. Hereford, resigned. Naylor is on leave of absence as president of Maintenance Engineering Corporation, Houston, to serve in the PAW position. Hereford, prior to his resignation, was acting assistant to director of materials for PAW, Washington.



FRANK BRIGGS has joined the editorial staff of THE OIL WEEKLY. He will work out of the company's headquarters at Houston. Briggs, a graduate in civil engineering from The Rice Institute, has been with The S. M. Jones Company for the past five years, the last two of which he was West Texas representative for the company.

C. J. DEXTER of Artesia was elected president of the New Mexico Oil and Gas Association at a recent meeting. Van S. Welch of Artesia was elected vice president, while Harry Leonard of Roswell was named treasurer and Hugh L. Sawyers was elected secretary. Elected members of the executive committee in addition to the officers, are M. E. Baish of Artesia, F. J. Danglade of Lovington, Dan D. Dobie of Hobbs, Edgar Kraus of Carlsbad, Emery Carper of Artesia and J. S. Griffith of Roswell.

T. E. SWIGERT, president of Shell Pipe Line Company, spoke before the Petroleum Engineering Club at Texas A. & M. College, December 10, on "Transportation of Crude Oil and Its Products in Peacetime and During the War Emergency."

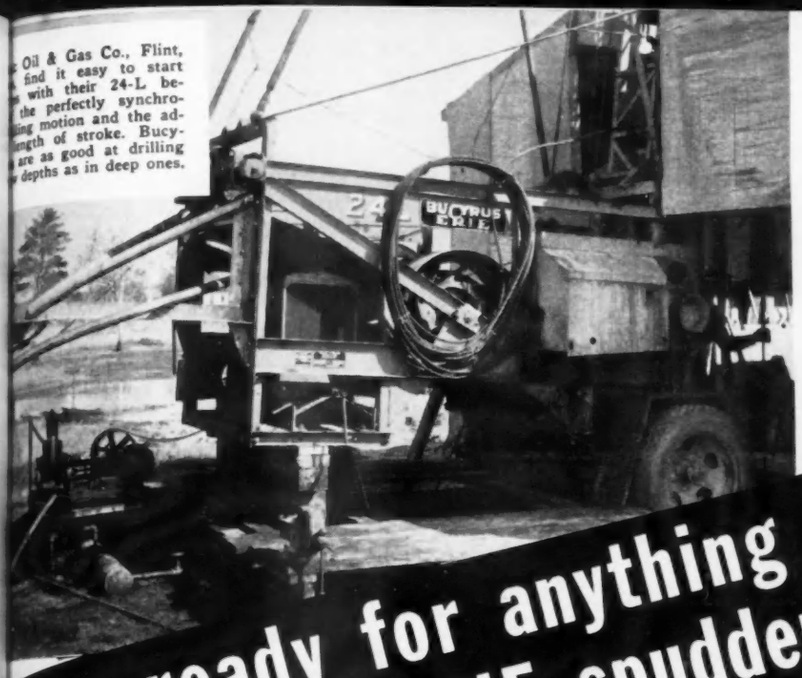
GEORGE J. O'BRIEN, assistant to the president and ranking Los Angeles executive of Standard Oil Company of California, has been elected a member of the board of directors of California Bank. A native of San Diego and a graduate of the University of California, O'Brien has been with Standard since 1916, when he went to work as a sailor on one of the company's tankers.

A. J. WOLFE of Stanolind Oil & Gas Company discussed the "Victory Tax" and Charles E. McCune of Peat, Marwick, Mitchell & Company discussed "The Revenue Act of 1942" before the Tulsa Petroleum Accountants Society, December 17.

DR. NORMAN D. FITZGERALD has resigned from the department of petroleum economics of Chase National Bank to accept a position as engineering economist with Great Lakes Carbon Corporation in New York.

J. C. HAPPENNY of Oklahoma Power & Water Company was elected president of Oklahoma Utilities Association at a recent meeting. E. C. Joullian of Consolidated Gas Utilities Corporation was elected first vice president, George McLean of Oklahoma Gas and Electric was named second vice president, while D. S. Kennedy of the same company was elected treasurer.

New directors elected to serve a three-year term are Glenn C. Kiley of Oklahoma Gas & Electric Company and Frank B. Long of Oklahoma Natural Gas Company. Those elected for a one-year term are J. P. Arnold of Public Service Company of Oklahoma, C. A.



Oil & Gas Co., Flint, find it easy to start with their 24-L be- the perfectly synchro- ing motion and the ad- ength of stroke. Bucy- are as good at drilling depths as in deep ones.

• Rutledge-Robinson & Moss-holder, Newark, Ohio, like the snappy drilling action provided by the rubber shock absorber on their 36-L. This exclusive feature also protects the drill from vibration and provides a better jarring motion when fishing.

u're ready for anything th BUCYRUS-ERIE spudders

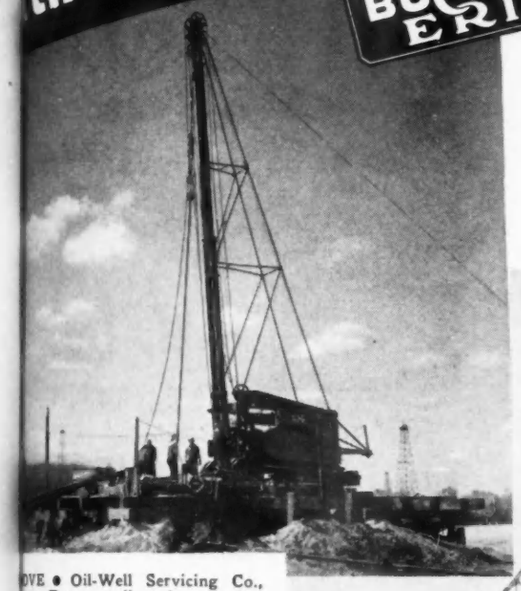
BUCYRUS ERIE

When the rush comes to catch up on the drilling and servicing we're postponing now, you'll want to buy drilling rigs in a hurry. That's why you should check now on the outstanding advantages of Bucyrus-Erie Spudders.

Check, for instance, their adaptability to changing conditions. You'll find they are fast-movers, easy and quick to set up or tear down. They operate under their own masts or under a standard derrick, and it's only a matter of minutes to change from one to the other. They're handy to operate and are streamlined into a compact, easily-accessible rig that works into any job-problem the easy way.

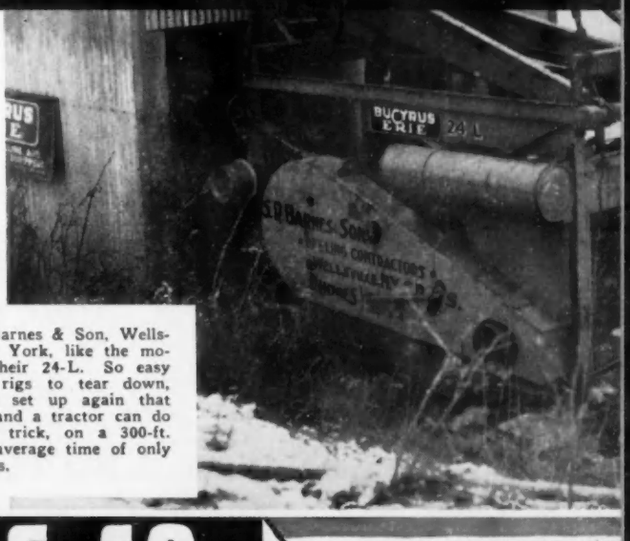
They're built for top-speed, lowest-cost drilling, with plenty of reserve capacity to reach out beyond their conservative ratings and do time-saving tricks on the jobs of the future that your tool-pushers haven't had time to dream up yet. Whether it's drilling, servicing, or fishing—Bucyrus-Erie Spudders have what it takes.

Look them over now. Check operations on one that's working near you. You'll notice the Bucyrus-Erie is the last to shut down and the first to start up in any fleet of drills.



OVE • Oil-Well Servicing Co., pa, Texas, pull rods out fast this 36-L. With the powerful driven, free-wheeling casing reel his rig they can handle rods and g easily and quickly.

GHT • Adams & Walters, St. n, Illinois, like the convenient agement of controls on their 36-L the fact there's no temper screw other with. These features are g help in pulling away from ms and in fishing for tools, be- they make it possible to re- the drill line quickly.



• S. R. Barnes & Son, Wellsville, New York, like the mobility of their 24-L. So easy are these rigs to tear down, move, and set up again that four men and a tractor can do the whole trick, on a 300-ft. move, in average time of only eight hours.

BUCYRUS-ERIE CO.
SOUTH MILWAUKEE • • WISCONSIN

★ SALES OFFICES AN DISTRIBUTORS IN AL PRINCIPAL OIL TERRITORIE

Breitung of Southwest Natural Gas Company, George A. Davis of Oklahoma Gas & Electric Company, J. C. Happenny and R. K. Lane of Public Service Company of Oklahoma. Hold-over directors include E. C. Joullian, A. F. Potter, Gas Service Company, S. I. McElhoes, Southwestern Light & Power Company, and W. L. Woodward of Zenith Gas System, Inc.

R. K. LANE, president of Public Service Company of Oklahoma, was elected president of the Tulsa Chamber of Commerce for 1943. P. H. Bohart, assistant to the vice president of Gulf Oil Corporation, was elected vice president, and B. P. Sibole, president of Stanolind Pipe Line Company, was elected second vice president.

BEAUFORD H. JESTER has been elected chairman of the Texas Railroad Commission, effective January 1. He is the newest member of the commission, and is given the chairmanship because his term is the first to expire, a procedure that has been customary for many years.

P. E. FITZGERALD, geologist with Dowell, Incorporated, Tulsa, spoke at Oklahoma City December 15 before the regular meeting of the Central Oklahoma Production Chapter of API on Plastics being used in the petroleum industry.

O. N. KNOX has been made division superintendent for Carter Oil Company in Oklahoma and Kansas to succeed the late W. B. Crutcher. Knox, who has been with the company for 20 years, will be stationed at Shawnee, Oklahoma.

H. E. DRALLS, manager of the petroleum section, industrial department, Westinghouse Electric and Manufacturing Company, discussed "The Victory Twins—Electricity and Oil," before a meeting of AIEE at Tulsa, December 17.

E. G. DAHLGREN, technical secretary of the Interstate Oil Compact Commission, spoke to the Engineers Club of Tulsa December 14 on the work of the compact and how it is aiding the industry.

WILLIAM C. CARTER, for 14 years vice president and for the past year executive vice president of Link-Belt Company, Chicago, has been elected president, succeeding Alfred Kauffmann, resigned, because of ill health.

L. B. JACKSON, Sapulpa, has acquired the interests of Oklahoma Gasoline Plants, Inc., as well as additional producing acreage in north-central Oklahoma.

Squeaks from the Bull Wheel

Brutal

"How do you like my gown? I got it for a ridiculous price."

"You mean you got it for an absurd figure."

Just Think

"Just think of it; steak only 20 cents a pound, eggs 15 cents a dozen, chickens 10 cents a pound and milk five cents a quart."

"Where?"

"Oh, nowhere, but just think of it."

Useful

"What's the use of having a time-table if your trains don't run on it?"

"Now you're all excited. How could you tell they was runnin' late if you didn't have a time-table?"

Irish

"When ye're licked in a foight ye ought to say ye've had enough."

"Sure if Oi can speak at all Oi'm not licked yet."

Difference

"What is the difference between a girl and a traffic cop?"

"When a traffic cop says 'stop,' he means it."

Characteristic

"Why do you call your girl 'Spearmint?' Because she is wriggly?"

"No, because she is always after meals."

Eskimo Stuff

"What would you say, darling, if I told you I pushed my dog team for a thousand miles through ice and snow, just to tell you that I love you?"

"I'd say that was a lot of mush."

Boasting

"Boy, when Ah hits a man he knows it."

"Dat's nothin', Big Boy. When Ah hits a man he don't know it till a week later."

Durable

"That's a good looking hat."

"I bought it five years ago, had it cleaned three times, changed it twice in restaurants, and it's still as good as new."

Revealing

"John, dear, I am to be in an amateur theatrical. What would folks say if I were to wear tights?"

"They would probably say that I married you for your money."

Brilliant

Clarice: "Jack is awfully clever. He's got brains enough for two."

Rachel: "Congratulations, dear! He's just the man for you!"

She Knows

"You ought to brace up and show your wife who is running things at your house," a big bossy man said to his henpecked friend.

"It isn't necessary. She knows."

Matter of Rank

"I have a pain in my abdomen," said the recruit to the Army doctor.

"Young man," replied the medico, "officers have abdomens, sergeants have stomachs, you have bellyache."

Mr Business Man

WHEN YOU COME TO FORT WORTH

Bring the Family

Yes sir! Next trip to Fort Worth bring along the wife and kids. A big outing for all of them—plus the thrill of stopping at Fort Worth's homefolks' hotel. Spacious, comfortably furnished, air-conditioned rooms; shower and tub baths. Featured dining service. Popular coffee shop. Centre of Fort Worth's theatre and down-town shopping district. . . . Next trip to Fort Worth combine business with pleasure. Bring the wife and kids and stop at

The WORTH

Shopping Centre

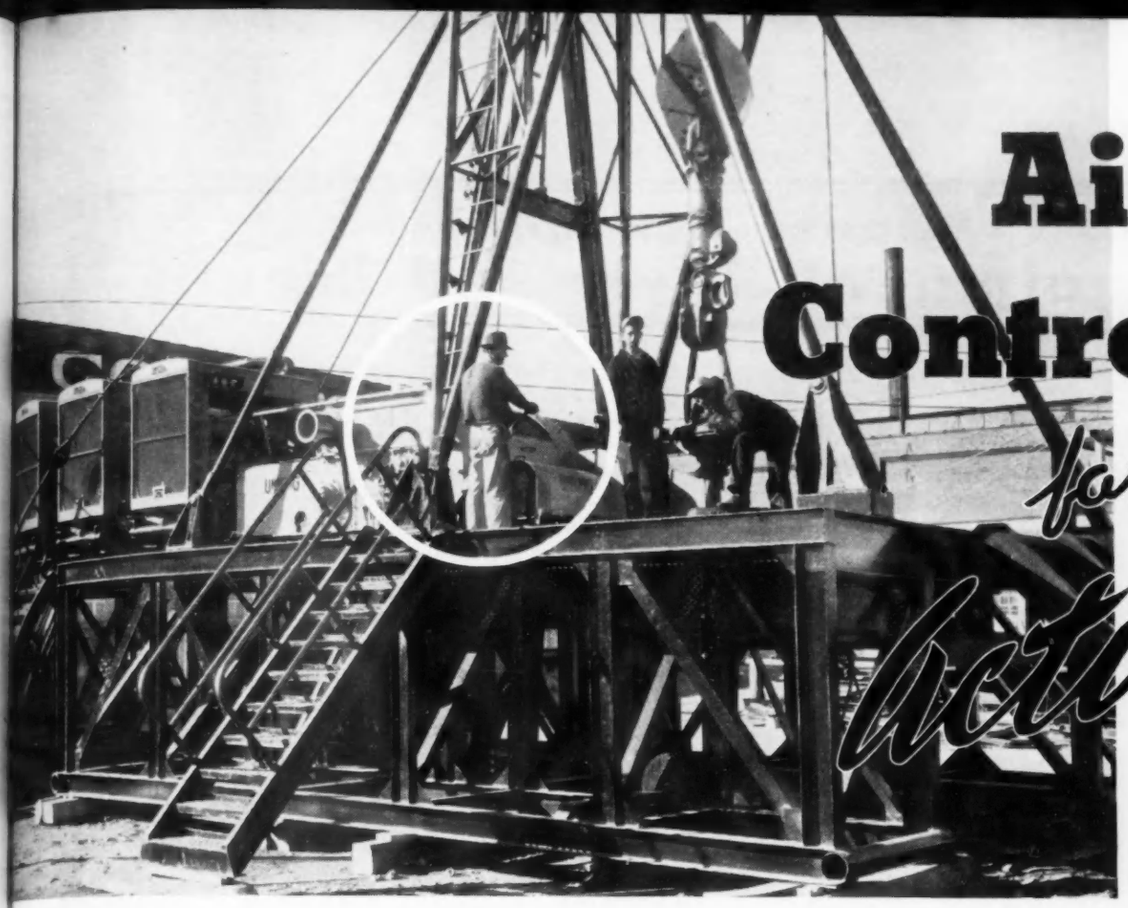
Theatre Centre

PERSONALIZED SERVICE

TRUE WESTERN HOSPITALITY

WORTH HOTEL

IN THE HEART OF FORT WORTH'S THEATRE AND DOWN-TOWN SHOPPING DISTRICT



Air Controlled for action-

U-10 SPITFIRE

The portable UNIT RIG in illustration is equipped with a Lee C. Moore 122 foot mast and built for 7000 feet drilling. It is powered with three WAK Waukesha engines, and equipped with two 7¼ x 12 mud pumps connected for series or compound operation.

UNIT RIG AIR-O-MATIC Clutches for Safety

Advantages

No Double Clutching Necessary — No Grabbing — No Shock — No Adjustments — No Toggles or Pins to Wear.

Operation Features

Powerful — Flexible — Safe — Finger Tip Control — Cushion Engagement.

Mechanical Features

Only one actuating part — Air Cooled (self induced) — Equalized Pressure on All Driving Parts — Torque Controlled — Definitely (This is important for Rotary Drive) — Self Compensating for wear of friction elements—Self Cleaning—Durable.

All controls are grouped at the driller's position for operating by air, the drum drives, rotary table drives and pump drives through Air-O-Matic clutches — and engine drives through Airflex clutches.

This group control makes it possible to connect or disconnect any one of the three engines at will, or either of the two pumps, thus permitting single or compounding operation of engines or pumps.

All drum and rotary speeds are selected through UNIT RIG Flexible Speed Control.

Safe as a Locomotive Air Brake!

UNIT RIG & EQUIPMENT CO.
TULSA OKLAHOMA U.S.A.

Notes for the Equipment Buyer and User

Welding Lamp

RADIANT LAMP CORPORATION

Radiant Lamp Corporation, Newark, New Jersey, has introduced a new type spatter-proof lamp for welding and rough industrial use. The new lamp, known as the Radiant Spatterproof Lamp, is made of a special glass that resists penetration of hot metal particles, and it is built to withstand severe handling.

By reducing lamp replacements, Radiant Spatterproof Lamps not only save money but increase the worker's production. Spatterproof lamps have a T10 bulb with medium screw base. Sizes include 50, 75, 100 and 150 watts.

A new 200-watt lamp which is guaranteed not to crack due to climatic conditions, even when used outdoors in an open fixture, has been added to the company's line of weatherproof lamps for general lighting service. The complete range is now from 200 to 2000 watts inclusive.

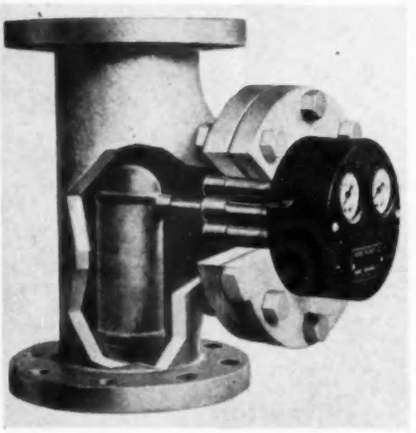
Liquid Controller

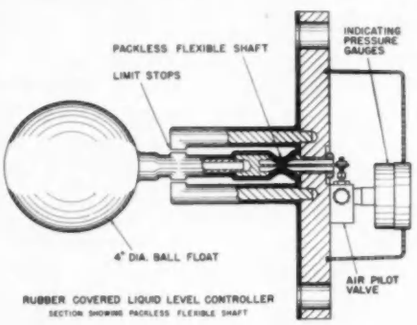
MOORE PRODUCTS COMPANY

Moore Products Company, Philadelphia, has announced a completely rubber- or neoprene-covered liquid-level controller for installation in a standard rubber-covered tee fitting, or for direct mounting in a tank containing corrosive fluids.

Rubber-covered-steel flexible shaft eliminates packing glands and bearings and also provides a simple friction-free method of transmitting the float motion to an air pilot valve or micro-switch as required.

The flexible shaft consists of a formed





RUBBER COVERED LIQUID LEVEL CONTROLLER
SECTION SHOWING PACKLESS FLEXIBLE SHAFT

tube similar to a Bourdon. A flat lever inside this tube connects directly with the air pilot valve or micro-switch for controlling the liquid level.

Operating on the principle of force change due to buoyancy, rather than a float riding on a moving level, sensitivity is such that a buoyancy change of less than 8 ounces will result in full travel of the diaphragm operated control valve. This permits the use of a small 4-inch diameter ball float and short float arm approximately 5½ inches in length. Interface level control of liquids having a specific gravity difference as small as .050 can be obtained by using larger floats and longer float arms.

Elliptical steel floats having ⅛-inch rubber covering are used where wider level changes are desirable. For high and low level cut-off or alarm, a micro-switch can be furnished in place of air pilot valve.

Maintenance Engineering Gives Extra Pay in Bonds

At a recent directors meeting of the Maintenance Engineering Corporation, Houston, it was decided to grant extra pay in war bonds to all regular employes—the amount to be computed on the basis of $2.25 for each month the employe has been in the service with a maximum amount to be paid of $275.

This arrangement is to include all regular employes who are in military service who present themselves for re-employment within 30 days after they have been discharged. This plan also includes employes working for the company prior to September 1, 1940, they being considered regular employes.

Macwhyte Company Gets E Award

The Macwhyte Company, manufacturers of wire rope, Kenosha, Wisconsin, have been awarded the Army-Navy E for excellence in production of war materials. The award was made November 21 and is given to all men and women employed by the company on that date.

Plans are under way for a special ceremony at which Army and Navy officers will present the award.

Caterpillar

Caterpillar Tractor Company, Peoria, Illinois, has issued "Caterpillar Carries On," a new eight-page booklet telling what the company and its dealers are doing to "keep 'em working" and to prevent the "orphaning" of tractors in spite of wartime pressure.

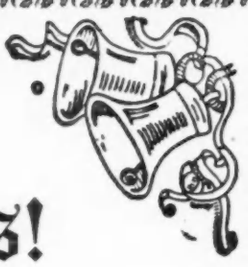
Derricks and Substructures

Emsco Derrick & Equipment Company, Los Angeles, has issued bulletin No. 150-E entitled "Steel Derricks and Substructures to Meet Every Oil Field Requirement." The bulletin includes descriptions of several types of derricks and substructures, amply illustrated with drawings and photographs.

Steam Hose

The B. F. Goodrich Company, Akron, Ohio, has issued a revised catalog containing simple, easy-to-read rules for the care and maintenance of steam hose as well as detailed instructions on the proper methods to attach couplings. Data on inside and outside diameters, weight and number of plies also are listed.

Greetings!



To our friends everywhere . . . may your Christmas be a merry one, and may the New Year bring a full measure of prosperity, happiness and peace.

MECO

MAINTENANCE ENGINEERING CORPORATION
HOUSTON, TEXAS, U. S. A.